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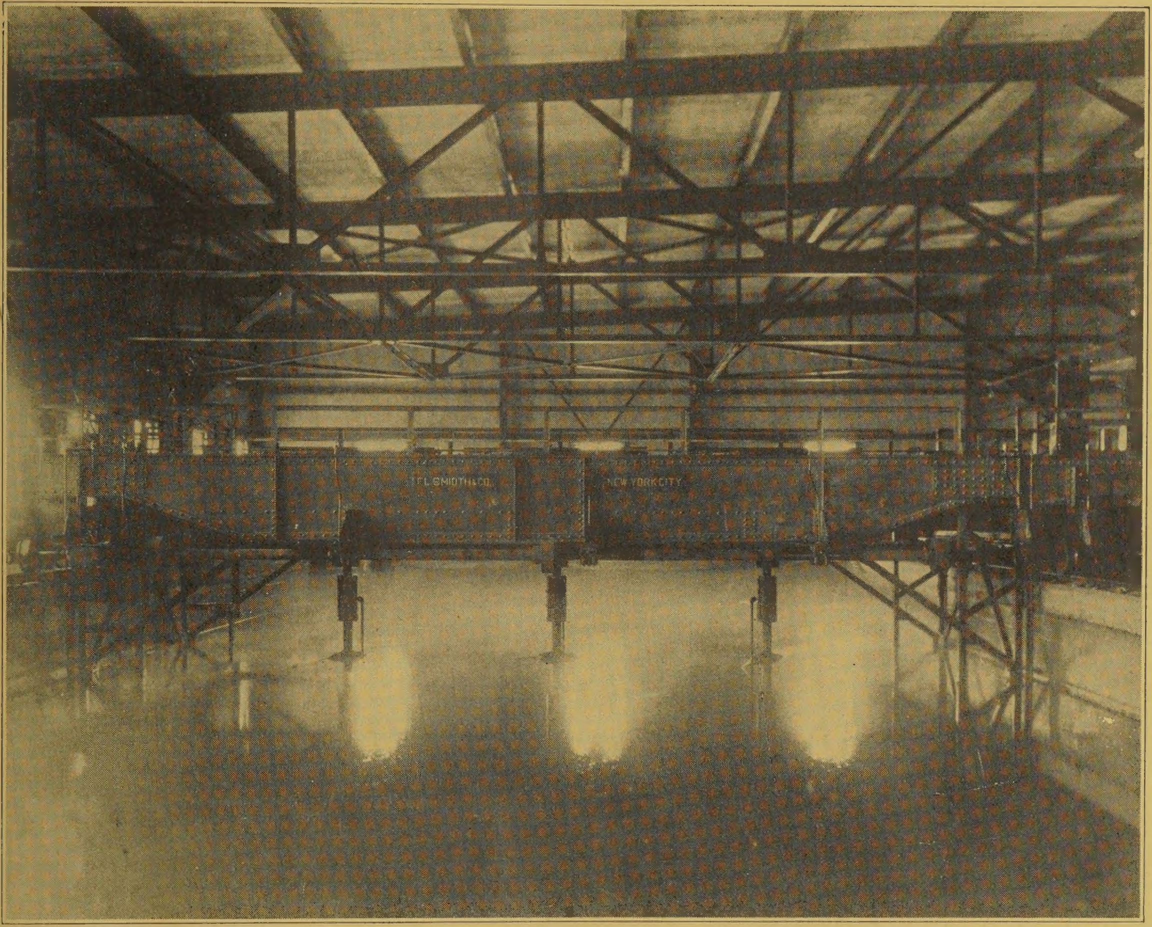

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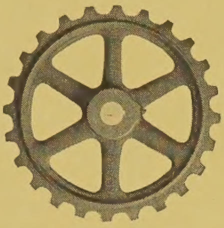

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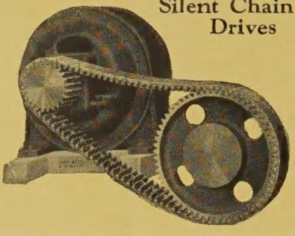

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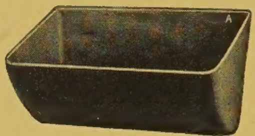

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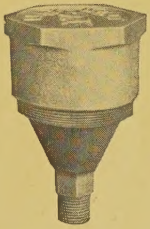

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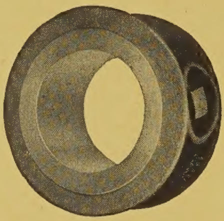

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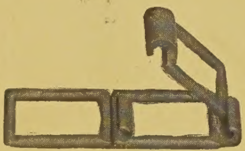

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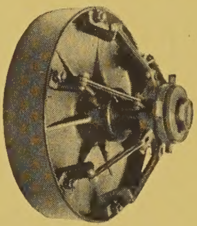

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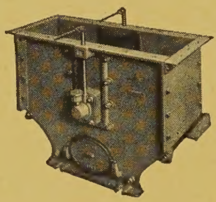

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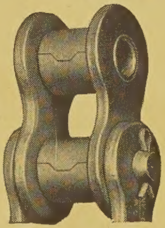

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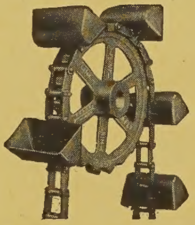

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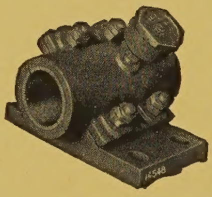

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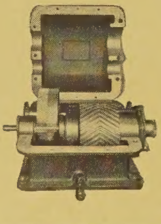

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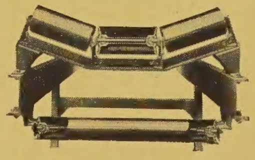

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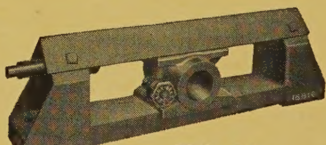

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MILL SECTION of

Concrete

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The Cement Mill Edition also contains all the material published in the corresponding Regular Edition and so provides news of the uses and merchandising of the materials whose manufacture is discussed in the Mill Edition. The Regular Section furnishes mill operating officials and mill executives valuable points of contact with the users of the materials they produce.

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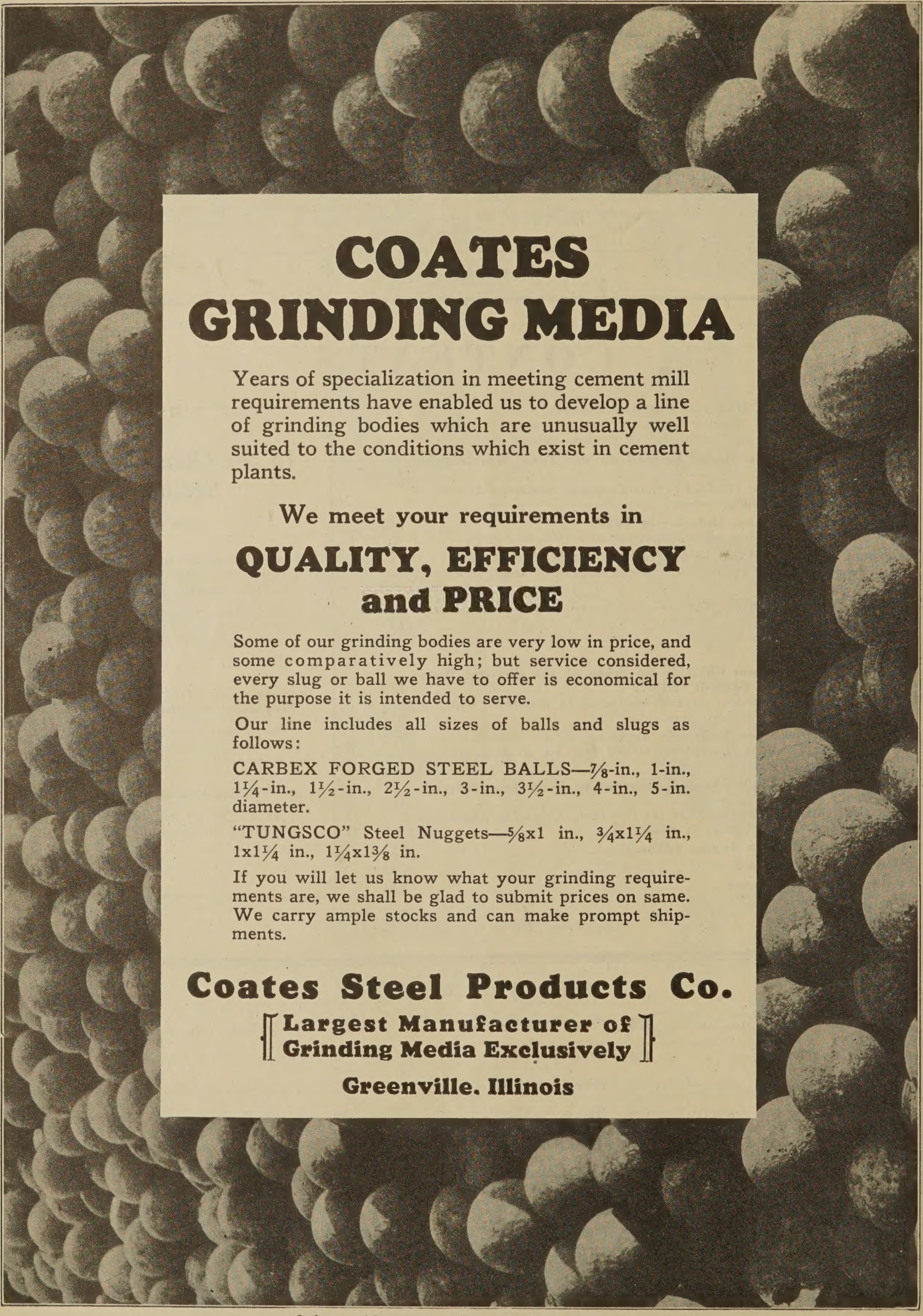

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MILL SECTION of

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Vol. 35 Chicago, October, 1929 No. 4

The Constitution of Hydrated Portland Cement

A Report of the Swedish Geological Society Covering Microscopic Investigations on the Constitution of Portland Cement Clinker and Its Chemical Reactions During Hardening

By G. ASSARSSON and N. SUNDIUS

FROM[1] the work of the Geophysical Laboratory of Washington it is known that the minerals resulting from a mixture of CaO, SiO_2 and Al_2O_3, in the proportions found in portland cement, will be trisilicate, disilicate and trialuminate of lime, when the reactions in the melt are complete. At a lower temperature, a somewhat larger amount of the disilicate and 5:3-aluminate will be formed, the corresponding quantities of CaO being set free at the same time. According to Rankin, these mineral compounds will be the principal ones to be expected in the clinker of the cement, its minor constituents (Fe_2O_3, MgO and alkalis) being neglected. In point of fact a microscopical examination of cement-clinker carried out by P. H. Bates has confirmed this.[2]

Microscopical Studies

Nothing but a review of this publication being available, one of the present writers carried out an optical study of the clinker minerals. This investigation will be mentioned here, as it was based on Tornebohm's old slides, which are deposited at the Geol. Survey of Sweden. The principal minerals found in these slides were the same as those named above. Thus Tornebohm's alite corresponds optically to the lime-trisilicate, the belite and felite to the β-disilicate, and the isotropical material, mentioned by him, will for the most part be trialuminate and 5:3-aluminate, the substance of the latter being recognizable by its lower refraction power and by the clouded and brownish appearance of the grains, the trialuminate being clear and free of inclusions. Both aluminates are seen in the same slide, but the 5:3-aluminate is not always present.

Between the belite and the felite there is the difference that the substance of the former is somewhat turbid and yellowish, the latter is clear and transparent. Moreover, the belite is distinguished by an intricate striation, though the substance of the grains is optically uniform. As the optical properties distinctly correspond to those of β-disilicate, the consequence must be that the β-form of the silicate is pseudomorph after the α-modification, while felite has crystallized in the β-form directly. The felite is in part transformed into γ-disilicate, easily distinguished by its lower birefraction and by its fibrous consistency. Very seldom are there seen, together with belite, really twinned disilicate grains, which may be remains of α-disilicate.

Tornebohm's celite does not correspond to any of the clinker minerals described by Rankin and Wright. In several respects it resembles a dicalcium ferrite,[3] but does not quite tally with this compound, the axial angle being small and the optical character positive. This difference will possibly be due to the replacement of some part of the iron oxide by Al_2O_3.

The two silicates, the trisilicate and the disilicate, always behave like different minerals, each displaying its own characteristic properties. The latter frequently occurs as small inclusions in the former, but even in this case the two minerals are decidedly different. This fact is not consistent with the view that the trisilicate is a solid solution of CaO in disilicate. In some cases, around the trisilicate grains, there is seen a small outermost border of a somewhat higher birefraction, the composition of which nothing is known. Even in these slides, however, the two minerals are optically distinctly different. In this paper, therefore, Rankin's view is adopted, that the trisilicate is a separate mineral of the composition $3\ CaO\ .\ SiO_2$.

Hydration Products

The hydration products of the separate clinker minerals and of mixtures of them, when treated with water or solutions of calcium hydrate, have been studied by several authors.[4] The products found by them are of two kinds, one consisting of an amorphous mass of hydrosilicate of a composition not definitely known, the other of crystallizing material, calcium-hydrate and hydro-trialuminate. Both the last-named compounds are at first generated as amorphous substances, but tend to assume a crystalline form. When sulphuric acid is present, the double compound sulphate-aluminate is formed also. These constituents would thus be expected in the hydrated cement.

---

[1] This paper is an abstract of two articles that will appear simultaneously in Swedish in the publication series of the Royal Board of Waterfalls (K. Vattenfallsstyrelsen, *Tekn. medd. Ser. B.*, Stockholm).

[2] CONCRETE CEMENT AGE (Cement Mill Section) 2, 3 (1913).

[3] Sosman and Mervin, *Journ. Wash. Acad. of Sc.*, Vol. VI, No. 15 (1916).

This result was checked by the present writers by means of a microscopical examination of slides of hydrated cement and concrete. For the preparation of the microscopical slides paraffin oil was at first used, instead of water, but this medium being inconvenient it was exchanged for a saturated solution of calcium-hydroxide in water. As the hydration process in the cement goes on very slowly after the hardening, the chemical influence on the cement of the slides will be negligible. The only probable effect of the contact with the lime-water is the transformation of some small amounts of amorphous calcium-hydroxide into a crystalline state. Before the preparation of the slides the cement was well dried in an exsiccator over phosphor-pentoxide.

On examination, a slide of hydrated cement is seen to contain a considerable amount of non-hydrated *clinker remains,* which are uniformly distributed in the dense, yellowish gray, hydrated cement mass. The clinker grains remaining in the cement can readily be determined and are found to consist for the greater part of disilicate. Trisilicate also occurs, but mostly as larger fragments, enveloped by clear zones of hydrosilicate. Around the disilicate grains these zones are much smaller and less conspicuous. Grains of clinker aluminate are practically absent. These facts accord with the results arrived at by the treatment of the separate clinker minerals with water, the rate of the hydrolysis of the disilicate being much slower than that of the aluminates and of the trisilicate. An estimate of the clinker grains in a cement 5½ months old, and kept in water, gave as a result about 14 vol.-per cent, of which about 8 per cent is made up of disilicate, 5-6 per cent of trisilicate, and the small remainder of the ferritic mineral, and some sporadic remains of trialuminate.

Under the crossed nicols the *calcium hydroxide* of the cement becomes visible. The component is well crystallized but forms homogeneous individuals only to a minor extent. For the most part it fills out the small spaces between the hydrated and partly hydrated clinker grains, but as the substance in neighboring spaces is often uniformly orientated, it forms in reality larger individuals, which enclose the clinker grains. In this way the calcium hydroxide may contribute not only to the density of the cement but also to its strength.

The *hydro-aluminate* is best observed after treating a slide with a water solution of patent blue. The grains colored in this way are to some extent amorphous, but for the most part they appear as badly crystallized, fibrous individuals. The fibrous structure is frequently seen arranged radially, and in the central part some small amount of amorphous substance, or in rare cases small remains of clinker aluminate, is to be detected. When most perfectly crystallized, the hydrated aluminous substance exhibits the properties of hydro-trialuminate.

Even when treating the cement in the said manner, the number of aluminate grains observable under the microscope is not great and does not correspond to the figure of Al_2O_3 of the analyses. The explanation of this fact may probably be that the substance in question is in part very finely distributed in the dense hydrosilicatic mass and is not visible in the microscope either. On the other hand, it is possible that the aluminate is isomorphic with the calcium hydroxide and partly mixed with the latter as a solid solution. This assumption is made possible *inter alia* by the similarity of the crystallographical properties of both compounds. No special researches on the subject have as yet been made.

The main part of the hydrated cement, however, is composed of the *amorphous silicate product.* About this it only can be said that it does not contain free hydrous silica, as it does not react to methylene blue. Furthermore, to judge from the varying amounts of crystallized calcium hydroxide in specimens exhibiting similar quantities of clinker remains, it is probable that the hydrosilicate mass may contain some indeterminable amounts of amorphous calcium hydroxide.

Hydrolysis of Clinker Minerals

Recently the problem of the hydrolysis of the clinker minerals has been attacked in another way by W. M. Lerch and R. H. Bogue.[5] These authors determined the hydrolyzing curves of the separate, pure clinker minerals. Of special interest for this work are the relations found in the trisilicate. This compound readily gives off a third of its calcium-content, after which the hydrolysis proceeds much more slowly. Lerch and Bogue furthermore determined the alkalinity of the water solutions in which the clinker minerals were not hydrolyzed. For the silicates the value of the PH is greater than that of a saturated solution of calcium hydroxide. The same is the case also for the dicalciumferrite. When treated with saturated calcium hydroxide the silicates will thus give off CaO, until equilibrium is established, probably when the remaining hydro-silicate is of about a monosilicatic composition.

Between the experiments of Lerch and Bogue and the relations in the hydrated cement, the chief difference lies in the quantity of the water used. In the experiments this quantity was great, but in the cement it is limited. This difference is of very great practical importance, but does not influence the course of the hydration process. A further difference lies in the iron, magnesium and alkali impurities in the cement. The presence of these elements, however, does not play any great part, the solubility of the hydroxides of iron and magnesium being very low. In what form the alkalis are present in the clinker is unknown, but special researches by the present writers have shown that the amounts that are dissolved in water and in solutions of calcium hydroxide are very small and do not appreciably influence the hydrolyzing processes.

In view of the relations referred to in the above, we can imagine the course of the hydrolyzing process during the hardening of the cement about as follows: The first effect of the water on the clinker minerals is a hydrolysis of all of them. As the quantity of the calcium hydroxide dissolved in the water rises to a certain amount, the hydrotrialuminate becomes stable, and this compound is now formed at the expense of all the aluminous substances. The silicates are not yet in equilibrium and do not reach this state even when the water becomes saturated with calcium hydroxide. The silicates thus continue to give off CaO to the water solution, and calcium hydroxide is deposited from it in a solid state. The same is the case with the ferritic mineral, which is split up into free iron oxide hydrate and CaO. Theoretically, and in the presence of sufficient quantities of water, the alteration of the clinker compounds would continue until they were all altered. The resulting product would then be a mixture of hydrotrialuminate (possibly plus sulphate-aluminate), calcium-hydroxide, iron oxide hydrate, and a hydrosilicate, probably of about a monosilicatic composition. This final state is far from being reached in the hardened cement. That this is the case is shown, *inter alia*, by the presence in the hardened cement of considerable quantities of non-hydrated clinker grains.

---

[4] S. Keisermann, Kolloidchem. Beihefte, Bd. 1, H. 10—11, 423 (1910), A. A. Klein and A. J. Phillips, Bureau of Standards, Dept. of Commerce, Techn. pap. No. 43 (1914)

P. H. Bates and A. A. Klein, Bureau of Standards, Dept. of Commerce, Techn. pap. No. 78 (1917) and 197 (1921).

[5] *J. Phys. Chem.,* 31, 1627 (1927).

From the microscopical examination of the cement it is known that the aluminates of the clinker are practically completely hydrated. As the remaining ferritic substance plays an unimportant part, the problem of the progress of the hydrolyzing effect during the hardening is wholly confined to the silicate complex. As we know the formula for the aluminate, the average composition of the silicate complex could be obtained, if we determined the percentage of free calcium hydroxide present in the cement.

Determining the Calcium Hydroxide

For the determination of the calcium hydroxide, the method of dissolving this substance in glycerine seemed to be applicable. This method was recently tried by Lerch and Bogue for CaO in clinker,[6] and found to be suitable in that case, the calcium bound in silicates, aluminates and ferrite not being dissolved. The chief factor of uncertainty as to the hydrated cement is the water absorbed by the gelatinous compounds and chemically bound in the hydroxide. All the latter, and at least the greater part of the former, may be free under the progress of the analysis and could be assumed to attack the silicates, producing a too high value of the hydroxide. There is, however, a factor that may counteract this error, namely, the slow rate of the hydrolysis of the remaining silicate complex in the cement. Moreover, the possible error may be reduced to a minimum by using large volumes of alcohol.

In the researches referred to in the following pages the volume of the alcohol-glycerine solution at the end of the process was about 100 cc., and in this volume the concentration of water attains a max. of 0.1 per cent, even when the cement used has a water-content of 25 per cent. The effect of this water concentration must be small. Another factor of uncertainty is the difficulty of leaching out the last remnants of the hydroxide from the interior of the cement grains. At the end of the operations the remaining cement powder was examined under a microscope, and tested for free lime by White's reagent, but with a negative result. By careful seeking there could be detected small traces of crystallized hydroxide in the innermost parts of a few of the larger grains, but for the rest the compound in question was absent. These small remnants may to some extent counteract the possible error caused by the water liberated. On the whole the value of CaO found may perhaps be a little too high, but does not substantially differ from the correct one. A comparative attempt on pure crystalline calcium hydroxide gave a quite satisfactory result. The rate of the dissolving of the hydroxide was at first very slow, but became more rapid after the addition of a few cc. of a solution of ammonium acetate. Compared with the analyzed cement, the rate of the reaction between the glycerine and the calcium hydroxide was slower, probably owing to the presence in the cement of amorphous parts of the hydroxide.

Before the analysis, the cement was dried in an exsiccator, crushed until the diameter of the grains was 1 mm., again dried in vacuum (12 mm.) over phosphor pentoxide. Lastly it was wetted through with alcohol and dried in vacuum. The sample treated in this way had the following composition:

	1	2
SiO_2	18.6	23.0
Al_2O_3	4.5	5.5
Fe_2O_3	2.0	2.5
CaO	52.0	64.2
MgO	1.3	1.6
CO_2	2.6	3.2
	81.0	100.0

1. Analysis of the dried cement.
2. The same figures as in 1, calculated as water-free.

To the figures of 1 there must be added 0.5 per cent of alkalis, determined as oxides, and 0.27 per cent of insoluble mineral grains (quartz, feldspar, etc.). SO_3 is present only in traces.

For the determination of the calcium hydroxide, a sample of 0.5 gr. was pulverized as finely as possible together with 5 cc. glycerine (G. = 1.26) and some absolute alcohol. The dissolving out of the hydroxide was performed in a similar manner to that described by the authors referred to above. The grinding of the powder and the boiling with alcohol and glycerine were repeated as long as the solution showed any reaction to $Ca(OH)_2$.

Two determinations performed in this way gave 8.8 and 9.2 per cent of CaO in the whole sample or, calculated on water-free material and on an average, 11.2 per cent.

Starting from this figure, an approximate calculation of the mineral content of the cement can be made. In the cement there is present a considerable amount of lime carbonate, and from the analysis it can be determined at 7.3 per cent.[7] Some minor part of this carbonate may already have been present in the clinker powder used, yet a great part may have been introduced and formed from the water added during the hydration of the clinker. Some part of the carbonate is also formed from the CO_2 of the air during the grinding and storing of the cement. At least the bulk of the latter amounts may have been formed at the expense of calcium hydroxide. Thus at least the greater part of the carbonate should strictly be reckoned as hydroxide, but in the absence of any norm for the division, the whole amount is set down as a separate compound of the cement. The course of the calculation appears in Table 1.

TABLE 1

	SiO_2	Al_2O_3	Fe_2O_3	MgO	CaO	CO_2	Total
Figures of the water-free cement	23.0	5.5	2.5	1.6	64.2	3.2	100.0
CaO in $Ca(OH)_2$					11.2		11.2
$CaCO_3$					4.1	3.2	7.3
$3CaO . Al_2O_3$		5.5			9.0		14.5
Fe_2O_3			2.5				2.5
Silicate complex	23.0			1.6	39.9		64.5

For the calculation the quite small amount of remaining ferrite in the cement is neglected, and the MgO is included in the silicates. In the silicate complex are included the hydrosilicate of the cement and the remaining unhydrated clinker grains. The figures of the table show the average composition of this complex to be:

$$CaO : SiO_2 = 2 : 1.04.$$

This formula conforms almost exactly to an average disilicatic proportion. As the clinker remains to some small extent include grains of trisilicate, the hydrated silicate mass may be a little richer in SiO_2 than is shown by the average formula. Also there is some uncertainty as to the lime of the carbonate referred to in the above. But even if we admit that as much as half this lime enters into the silicate complex, its formula would not be substantially altered. This estimate, however, is certainly much too high.

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[6] *Ind. Eng. Chem.* 18, 739 (1926).

[7] This and all figures following refer to water-free composition.

This result is somewhat surprising, as most earlier authors seem to have supposed an approximately monosilicatic formula for the hydrosilicate in the cement, though opinions in favor of a disilicate are not entirely absent. The analytically found formula agrees well with the hydrolyzing curves of Lerch and Bogue, also it is in fairly close agreement with the mineralogical relations found in the cement.

From the data arrived at in the above, it follows that the process of the hardening of the cement consists of a hydrating of the aluminates and their transformation into hydro-trialuminate, a decomposition of most of the ferritic substance and a splitting off of one of the CaO-molecules of the trisilicate. These reactions go on relatively suddenly. The ferrite in itself is not very easy to hydrolyze, but its amount is small. The disilicate in the clinker, on the other hand, is but little affected. The further hydrolyses of the still average disilicatic silicate complex proceed much more slowly. As the silicate complex is not yet in equilibrium with the saturated solution of calcium hydroxide, it should be further decomposed. The fact that it is not, but remains unaltered, must be due to the commencing relative deficiency of water in the hardening cement and to the dense, gelatinous consistency of the hydrosilicate mass, which prevents further reactions.

Thus, the cement does not represent a chemical system in equilibrium. On the contrary, each increase of the water-content will cause a continued hydrolysis of the silicate complex and a generation of more lime hydroxide. That the cement can, nevertheless, exist unchanged for many years, even when immersed in water, is wholly to be attributed to the density of its structure and of the hydrosilicate.

Monolith Stock Admitted to New York Curb

The Monolith Portland Cement Company, a Pacific Coast concern, was admitted to unlisted trading privileges on the New York Curb Exchange on August 10th. Two hundred fifty thousand shares of the common stock and 150,000 shares of the preferred stock were admitted to the exchange.

Dewey Plans New Wharf for Barge Line

Preliminary construction work on a $200,000 terminal wharf for the Dewey Portland Cement Company has been started at the company's plant near Buffalo and it will be completed during the winter, according to an announcement by H. F. Tyler, vice-president.

Cement and crushed rock will be shipped south by the Dewey Company when navigation opens in the spring. Shipments will be at the rate of about a barge a month at first, and will be increased gradually to a barge a week.

The company has contemplated erecting a terminal for some time due to the revival of barge line traffic on the upper river. Decision to start the work came after a study of the various factors involved when it became certain that use of the water for transporting cement would be profitable.

Work now under way consists of driving piles preparatory to building a cofferdam. The dock itself will be 400 feet long and 24 feet wide and will accommodate two of the largest barges now in use on the river at one time. The construction will be of concrete.

Monolith Semi-Annual Report Shows Dividends

Monolith Portland Cement Company in a report issued during August by Coy Burnett, president, for the first half of 1929, showed net profits available for dividends of $307,732, equal after preferred dividend requirements of $60,000 to $1.10 a share on 225,000 common shares outstanding, or at the annual rate of $2.20 a share on the common stock.

The report, Mr. Burnett stated, does not cover the operations of the Monolith Midwest Cement Company, which started its plant last spring.

The half-year showing of Monolith Portland Cement Company, exclusive of the Midwest Company, compares favorably with the earnings for the entire year of 1928, when net profits available for dividends totaled $375,780.20, equal after preferred dividends to $1.71 a share on 150,000 common shares outstanding.

Net sales during the first six months of this year amounted to $1,534,985.26. Gross profits on sales were $495,217.52, after deduction of $915,621.28 for labor, supplies, royalties and plant expenses and after allowance of $124,146.46 for depreciation and amortization of leasehold on limestone deposits, based on appraised values.

Net profits of operations were $286,474.64 after selling and administrative expenses of $208,742.88, while interest received and other income totaled $26,309.63 net, making profits before interest charges and federal income tax, $312,784.27.

Deduction of $18,333.33 for interest charges and amortization of bond discount and expenses and of $34,192.44 for Federal income tax provision left a balance of $260,258.50, to which was added back $47,473.54 for depreciation and depletion charges on excess of appraised values of plant, equipment and limestone deposits over actual cost values, bringing net profits available for dividends to $307,732.04.

Eastern Mills Reduce Prices

Price reductions ranging from thirty to twenty cents a barrel were made by a number of eastern plants late in August, bringing the New York base price to $2.33.

Alpha Portland Cement Company was one of the first to take this action, announcing a reduction of 20 cents a barrel on the Hudson river base, and 30 cents a barrel on the Lehigh valley base.

Sluggish Market Affects Lehigh Mill

Due to a slow market, the Lehigh Portland Cement Company plant at LaSalle, Illinois, announced on August 16th a 40 per cent reduction in operations, effective at once.

Penn-Dixie Dividend

The Pennsylvania-Dixie Cement Corporation declared a regular quarterly dividend of $1.75 on its 7 per cent preferred "A" stock, payable September 15th to stockholders of record August 31st.

"Longhorn"—A New Brand Burned on the Texas Building Industry

How the Republic Portland Cement Company Introduced Its Product to the Texas Building Industry

AN example of how well-prepared and carefully placed advertising can quickly bring into the public consciousness a new cement brand is offered by the advertising series now running for the Republic Portland Cement Company, San Antonio, Texas.

The three and a half million dollar plant of this company has been in operation for but a few short weeks. The name of its portland cement, "Longhorn" brand, is a new one, and entirely unfamiliar to the consuming public.

The problem that confronted this cement manufacturer was one which started from scratch . . . a new plant, a new product, an untested demand. The first advertisement in the series had as its purpose to impress indelibly the brand name, "Longhorn," on the public mind. And how this was accomplished forms an unusual story.

A Texas Symbol

There is romantic tradition galore surrounding the Longhorn cattle, which symbolizes the Texas of history. Public interest and attention will always center on anything that relates to this romantic figure.

It is not surprising, then, that this first page advertisement was so powerful with its heading of, "Interesting facts about the first citizen of the republic of Texas—a mighty pioneer who wrote some of the most daring and romantic pages in Texas History."

The copy was relieved by a handsome halftone illustration of a Longhorn steer, a pen and ink sketch of the familiar cowboy with his lariat forming a border for the copy matter, and balanced by a box containing actual reproductions of famous Longhorn brands.

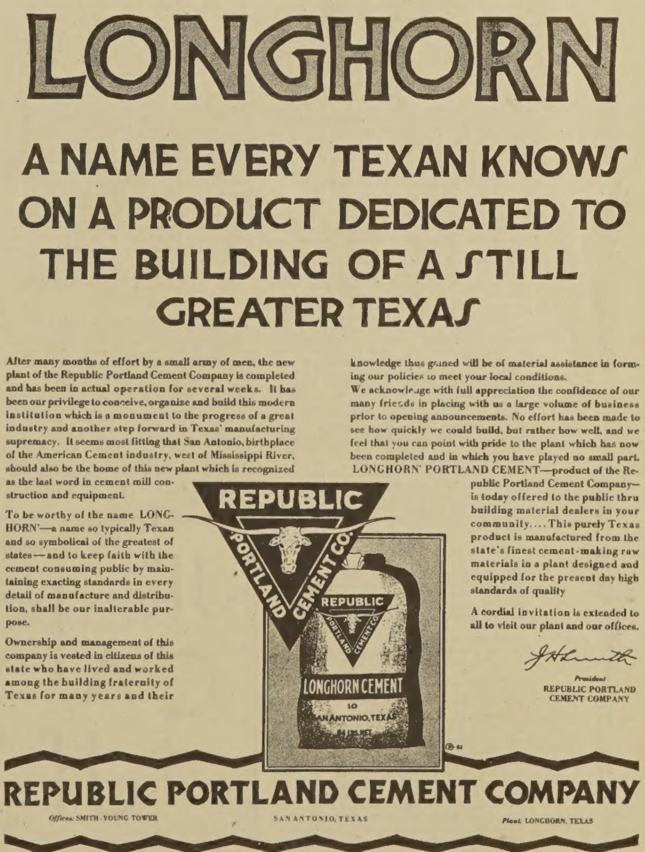
An unusual feature about this first advertisement is the fact that the beautifully written story of the Longhorn makes no effort to sell portland cement. Instead, all attention is concentrated on making the reading matter as interesting as the story of the Longhorn itself. His colorful career, his invaluable part in creating the empire of Texas, and finally his gradual disappearance, form a fascinating romance that has 100 per cent reader interest for Texans.

And finally, the only tie-up with portland cement is the brief last paragraph which reads, "Consequently, it is with full appreciation of what the Longhorn means to Texans, and with a sincere desire to be worthy of that name, that the Republic Portland Cement Company will produce a new Texas product dedicated to the building of a still greater Texas and bearing the brand name, "Longhorn Portland Cement."

Thus, by this piece of copy which is probably the most complete and authentic description of the Longhorn cattle ever written, was the brand name burned indelibly into the public mind.

This advertisement appeared in twenty metropolitan Texas newspapers, full page in size, and thoroughly covering the state. The response that it created is significant. From every corner of the state requests came pouring in for additional copies of this fascinating story. A special press run was made on fine buff paper, suitable for framing, and sent out to the many who requested this picturesque and significant history of the Longhorn.

One week later the second advertisement of the series followed. Also occupying a full page, this fine display capitalized on the consciousness of the name Longhorn, created in the first of the series.


REPUBLIC
PORTLAND CEMENT CO.
LONGHORN CEMENT
10
SAN ANTONIO, TEXAS
94 LBS. NET

LONGHORN

A NAME EVERY TEXAN KNOWS ON A PRODUCT DEDICATED TO THE BUILDING OF A STILL GREATER TEXAS

After many months of effort by a small army of men, the new plant of the Republic Portland Cement Company is completed and has been in actual operation for several weeks. It has been our privilege to conceive, organize and build this modern institution which is a monument to the progress of a great industry and another step forward in Texas' manufacturing supremacy. It seems most fitting that San Antonio, birthplace of the American Cement industry, west of Mississippi River, should also be the home of this new plant which is recognized as the last word in cement mill construction and equipment.

To be worthy of the name LONGHORN'—a name so typically Texan and so symbolical of the greatest of states—and to keep faith with the cement consuming public by maintaining exacting standards in every detail of manufacture and distribution, shall be our inalterable purpose.

Ownership and management of this company is vested in citizens of this state who have lived and worked among the building fraternity of Texas for many years and their knowledge thus gained will be of material assistance in forming our policies to meet your local conditions.

We acknowledge with full appreciation the confidence of our many friends in placing with us a large volume of business prior to opening announcements. No effort has been made to see how quickly we could build, but rather how well, and we feel that you can point with pride to the plant which has now been completed and in which you have played no small part.

LONGHORN' PORTLAND CEMENT—product of the Republic Portland Cement Company—is today offered to the public thru building material dealers in your community.... This purely Texas product is manufactured from the state's finest cement-making raw materials in a plant designed and equipped for the present day high standards of quality

A cordial invitation is extended to all to visit our plant and our offices.

President
REPUBLIC PORTLAND
CEMENT COMPANY

REPUBLIC PORTLAND CEMENT COMPANY

Offices: SMITH-YOUNG TOWER SAN ANTONIO, TEXAS *Plant:* LONGHORN, TEXAS

Reprint of a page advertisement appearing in Leading Texas Newspapers, Thursday, August 15, 1929.

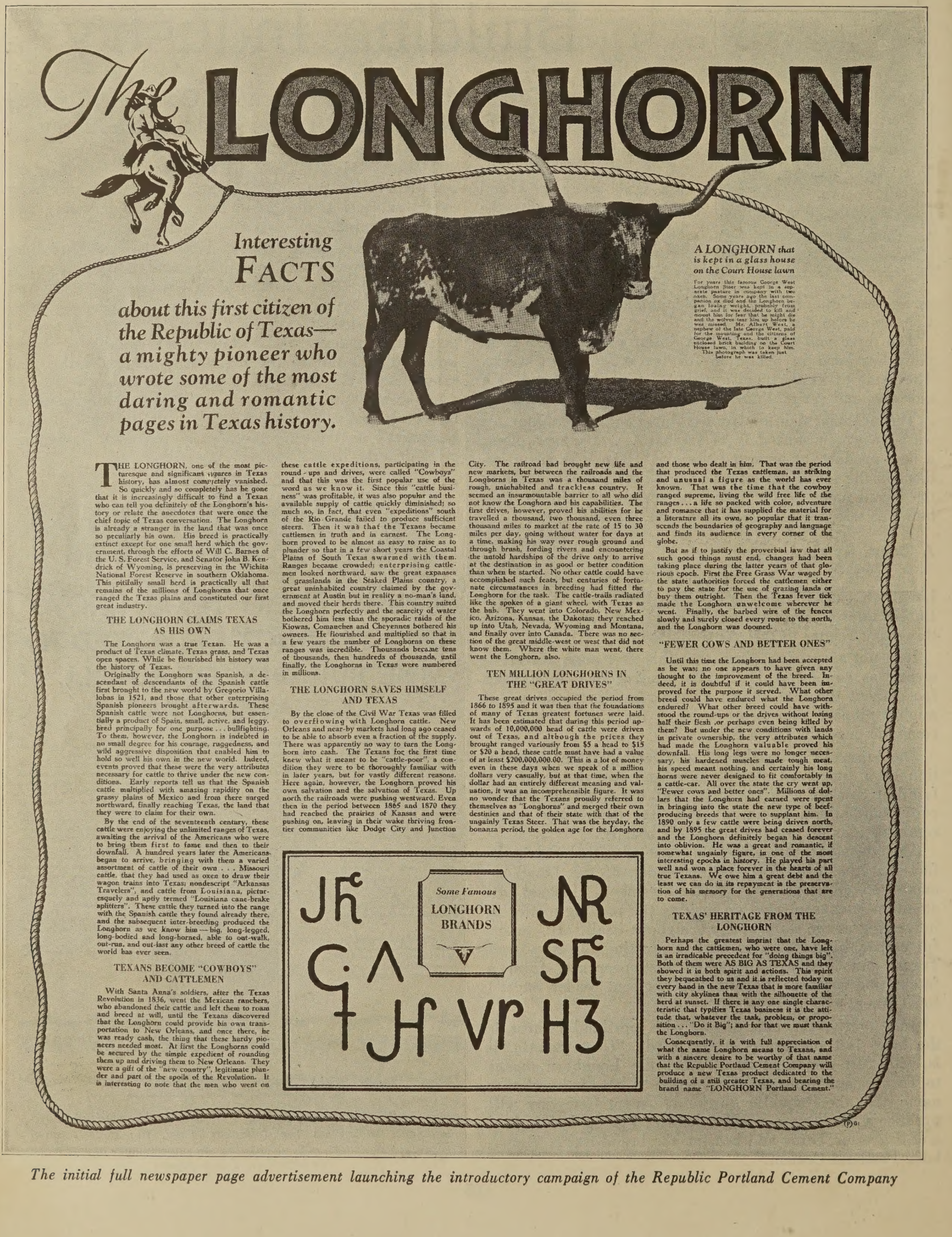
One week after the widespread publication of the initial advertisement, shown on the following page, the advertisement reproduced above, also occupying an entire newspaper page, appeared in Texas papers

The Plant is Featured

Announcement was made that the new plant of the Republic Portland Cement Company had been completed. The important point that the ownership and management of this company was invested in citizens of the state who had lived and worked among the building fraternity of Texas for many years was played up.

To directly sell Republic portland cement and acquaint the trade with the fact that it was now available for shipment was the purpose of this second advertisement. The new brand mark and the new sack were pictured prominently along with the name Longhorn.

One week following the appearance of the second advertisement, a four-fold pamphlet was mailed to every


The LONGHORN
Some Famous LONGHORN BRANDS
JH
JNR
SH
VP
H3

Interesting FACTS *about this first citizen of the Republic of Texas—a mighty pioneer who wrote some of the most daring and romantic pages in Texas history.*

A LONGHORN *that is kept in a glass house on the Court House lawn*

For years this famous George West Longhorn Steer was kept in a separate pasture in company with two oxen. Some years ago the last companion ox died and the Longhorn began losing weight, probably from grief, and it was decided to kill and mount him for fear that he might die and the wolves tear him up before he was missed. Mr. Albert West, a nephew of the late George West, paid for the mounting and the citizens of George West, Texas, built a glass enclosed brick building on the Court House lawn, in which to keep him. This photograph was taken just before he was killed.

THE LONGHORN, one of the most picturesque and significant figures in Texas history, has almost completely vanished. So quickly and so completely has he gone that it is increasingly difficult to find a Texan who can tell you definitely of the Longhorn's history or relate the anecdotes that were once the chief topic of Texas conversation. The Longhorn is already a stranger in the land that was once so peculiarly his own. His breed is practically extinct except for one small herd which the government, through the efforts of Will C. Barnes of the U. S. Forest Service, and Senator John B. Kendrick of Wyoming, is preserving in the Wichita National Forest Reserve in southern Oklahoma. This pitifully small herd is practically all that remains of the millions of Longhorns that once ranged the Texas plains and constituted our first great industry.

THE LONGHORN CLAIMS TEXAS AS HIS OWN

The Longhorn was a true Texan. He was a product of Texas climate, Texas grass, and Texas open spaces. While he flourished his history was the history of Texas.

Originally the Longhorn was Spanish, a descendant of descendants of the Spanish cattle first brought to the new world by Gregorio Villalobos in 1521, and those that other enterprising Spanish pioneers brought afterwards. These Spanish cattle were not Longhorns, but essentially a product of Spain, small, active, and leggy, bred principally for one purpose . . . bullfighting. To them, however, the Longhorn is indebted in no small degree for his courage, ruggedness, and wild aggressive disposition that enabled him to hold so well his own in the new world. Indeed, events proved that these were the very attributes necessary for cattle to thrive under the new conditions. Early reports tell us that the Spanish cattle multiplied with amazing rapidity on the grassy plains of Mexico and from there surged northward, finally reaching Texas, the land that they were to claim for their own.

By the end of the seventeenth century, these cattle were enjoying the unlimited ranges of Texas, awaiting the arrival of the Americans who were to bring them first to fame and then to their downfall. A hundred years later the Americans began to arrive, bringing with them a varied assortment of cattle of their own . . . Missouri cattle, that they had used as oxen to draw their wagon trains into Texas; nondescript "Arkansas Travelers", and cattle from Louisiana, picturesquely and aptly termed "Louisiana cane-brake splitters". These cattle they turned into the range with the Spanish cattle they found already there, and the subsequent inter-breeding produced the Longhorn as we know him — big, long-legged, long-bodied and long-horned, able to out-walk, out-run, and out-last any other breed of cattle the world has ever seen.

TEXANS BECOME "COWBOYS" AND CATTLEMEN

With Santa Anna's soldiers, after the Texas Revolution in 1836, went the Mexican ranchers, who abandoned their cattle and left them to roam and breed at will, until the Texans discovered that the Longhorn could provide his own transportation to New Orleans, and once there, he was ready cash, the thing that these hardy pioneers needed most. At first the Longhorns could be secured by the simple expedient of rounding them up and driving them to New Orleans. They were a gift of the "new country", legitimate plunder and part of the spoils of the Revolution. It is interesting to note that the men who went on these cattle expeditions, participating in the round-ups and drives, were called "Cowboys" and that this was the first popular use of the word as we know it. Since this "cattle business" was profitable, it was also popular and the available supply of cattle quickly diminished; so much so, in fact, that even "expeditions" south of the Rio Grande failed to produce sufficient steers. Then it was that the Texans became cattlemen in truth and in earnest. The Longhorn proved to be almost as easy to raise as to plunder so that in a few short years the Coastal Plains of South Texas swarmed with them. Ranges became crowded; enterprising cattlemen looked northward, saw the great expanses of grasslands in the Staked Plains country, a great uninhabited country claimed by the government at Austin but in reality a no-man's land, and moved their herds there. This country suited the Longhorn perfectly and the scarcity of water bothered him less than the sporadic raids of the Kiowas, Comanches and Cheyennes bothered his owners. He flourished and multiplied so that in a few years the number of Longhorns on these ranges was incredible. Thousands became tens of thousands, then hundreds of thousands, until finally, the Longhorns in Texas were numbered in millions.

THE LONGHORN SAVES HIMSELF AND TEXAS

By the close of the Civil War Texas was filled to overflowing with Longhorn cattle. New Orleans and near-by markets had long ago ceased to be able to absorb even a fraction of the supply. There was apparently no way to turn the Longhorn into cash. The Texans for the first time knew what it meant to be "cattle-poor", a condition they were to be thoroughly familiar with in later years, but for vastly different reasons. Here again, however, the Longhorn proved his own salvation and the salvation of Texas. Up north the railroads were pushing westward. Even then in the period between 1865 and 1870 they had reached the prairies of Kansas and were pushing on, leaving in their wake thriving frontier communities like Dodge City and Junction City. The railroad had brought new life and new markets, but between the railroads and the Longhorns in Texas was a thousand miles of rough, uninhabited and trackless country. It seemed an insurmountable barrier to all who did not know the Longhorn and his capabilities. The first drives, however, proved his abilities for he travelled a thousand, two thousand, even three thousand miles to market at the rate of 15 to 30 miles per day, going without water for days at a time, making his way over rough ground and through brush, fording rivers and encountering the untold hardships of the drive only to arrive at the destination in as good or better condition than when he started. No other cattle could have accomplished such feats, but centuries of fortunate circumstances in breeding had fitted the Longhorn for the task. The cattle-trails radiated like the spokes of a giant wheel, with Texas as the hub. They went into Colorado, New Mexico, Arizona, Kansas, the Dakotas; they reached up into Utah, Nevada, Wyoming and Montana, and finally over into Canada. There was no section of the great middle-west or west that did not know them. Where the white man went, there went the Longhorn, also.

TEN MILLION LONGHORNS IN THE "GREAT DRIVES"

These great drives occupied the period from 1866 to 1895 and it was then that the foundations of many of Texas greatest fortunes were laid. It has been estimated that during this period upwards of 10,000,000 head of cattle were driven out of Texas, and although the prices they brought ranged variously from $5 a head to $15 or $20 a head, these cattle must have had a value of at least $200,000,000.00. This is a lot of money even in these days when we speak of a million dollars very casually, but at that time, when the dollar had an entirely different meaning and valuation, it was an incomprehensible figure. It was no wonder that the Texans proudly referred to themselves as "Longhorns" and merged their own destinies and that of their state with that of the ungainly Texas Steer. That was the heyday, the bonanza period, the golden age for the Longhorn and those who dealt in him. That was the period that produced the Texas cattleman, as striking and unusual a figure as the world has ever known. That was the time that the cowboy ranged supreme, living the wild free life of the ranges . . . a life so packed with color, adventure and romance that it has supplied the material for a literature all its own, so popular that it transcends the boundaries of geography and language and finds its audience in every corner of the globe.

But as if to justify the proverbial law that all such good things must end, changes had been taking place during the latter years of that glorious epoch. First the Free Grass War waged by the state authorities forced the cattlemen either to pay the state for the use of grazing lands or buy them outright. Then the Texas fever tick made the Longhorn unwelcome wherever he went. Finally, the barbed wire of the fences slowly and surely closed every route to the north, and the Longhorn was doomed.

"FEWER COWS AND BETTER ONES"

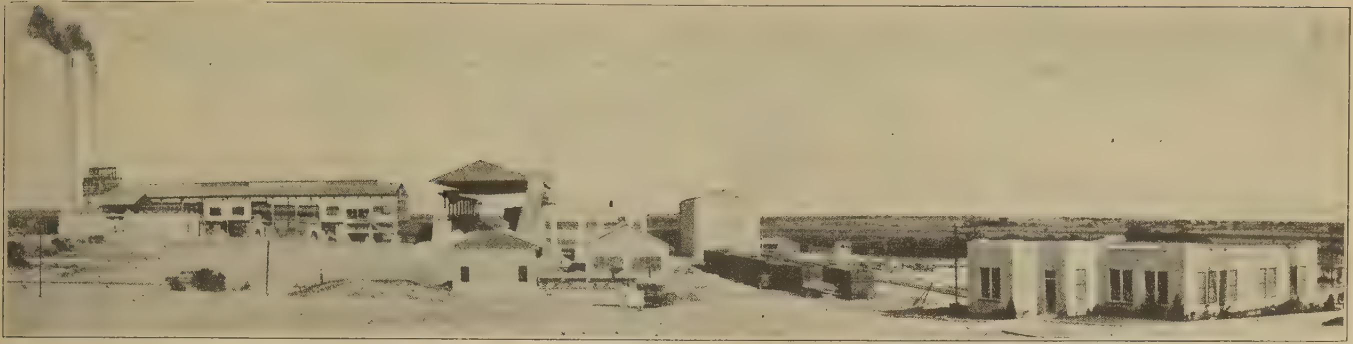
Until this time the Longhorn had been accepted as he was; no one appears to have given any thought to the improvement of the breed. Indeed, it is doubtful if it could have been improved for the purpose it served. What other breed could have endured what the Longhorn endured? What other breed could have withstood the round-ups or the drives without losing half their flesh ,or perhaps even being killed by them? But under the new conditions with lands in private ownership, the very attributes which had made the Longhorn valuable proved his downfall. His long legs were no longer necessary, his hardened muscles made tough meat, his speed meant nothing, and certainly his long horns were never designed to fit comfortably in a cattle-car. All over the state the cry went up, "Fewer cows and better ones". Millions of dollars that the Longhorn had earned were spent in bringing into the state the new type of beef-producing breeds that were to supplant him. In 1890 only a few cattle were being driven north, and by 1895 the great drives had ceased forever and the Longhorn definitely began his descent into oblivion. He was a great and romantic, if somewhat ungainly figure, in one of the most interesting epochs in history. He played his part well and won a place forever in the hearts of all true Texans. We owe him a great debt and the least we can do in its repayment is the preservation of his memory for the generations that are to come.

TEXAS' HERITAGE FROM THE LONGHORN

Perhaps the greatest imprint that the Longhorn and the cattlemen, who were one, have left is an irradicable precedent for "doing things big". Both of them were AS BIG AS TEXAS and they showed it in both spirit and actions. This spirit they bequeathed to us and it is reflected today on every hand in the new Texas that is more familiar with city skylines than with the silhouette of the herd at sunset. If there is any one single characteristic that typifies Texas business it is the attitude that, whatever the task, problem, or proposition . . . "Do it Big"; and for that we must thank the Longhorn.

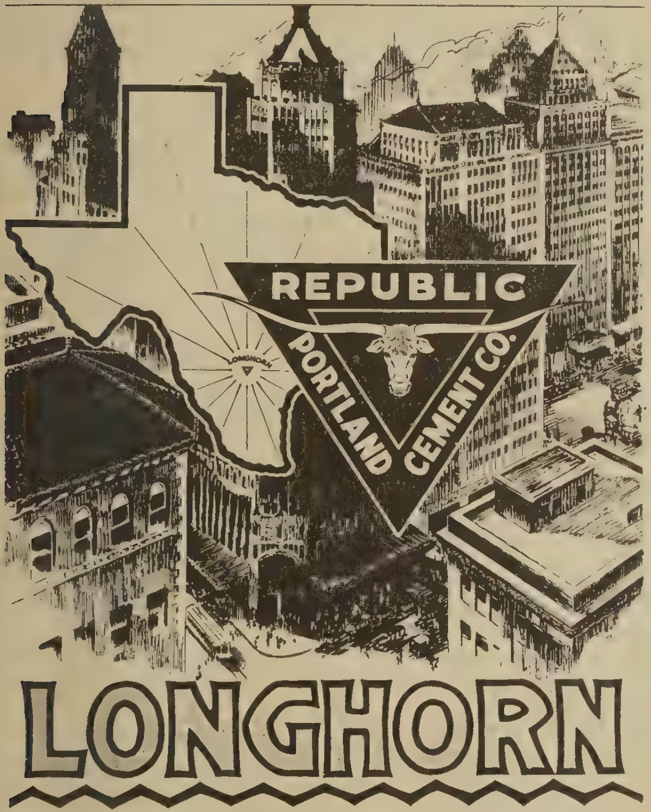
Consequently, it is with full appreciation of what the name Longhorn means to Texans, and with a sincere desire to be worthy of that name that the Republic Portland Cement Company will produce a new Texas product dedicated to the building of a still greater Texas, and bearing the brand name "LONGHORN Portland Cement."

The initial full newspaper page advertisement launching the introductory campaign of the Republic Portland Cement Company



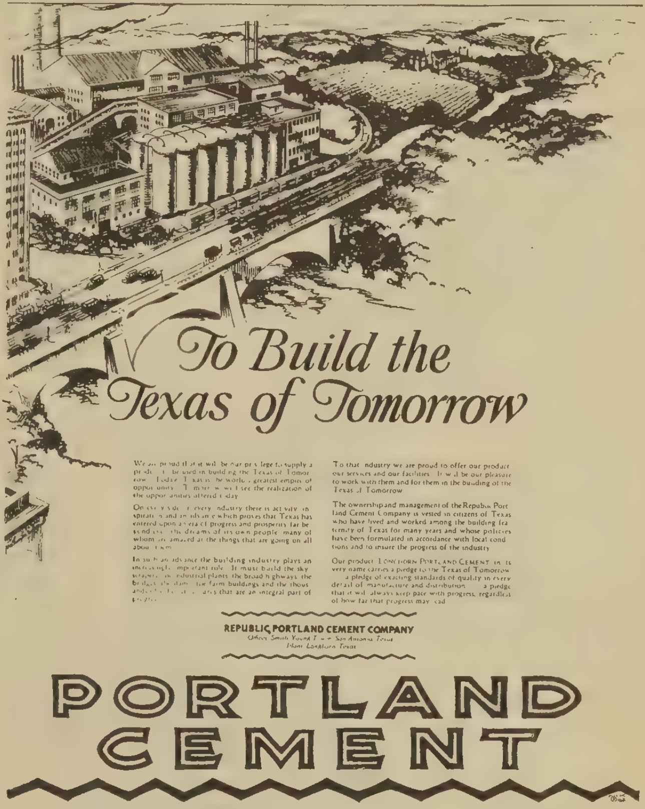
Panoramic view of the plant of the Republic Portland Cement Company, located at Longhorn, Texas. The offices are at San Antonio

building material dealer and contractor in the state of Texas. This pamphlet contained the full story of the fact that the plant was now in successful operation and was illustrated with halftone photographs of the actual plant. A close tie-up was made by the reproduction of the trade mark and sack in full colors. The now familiar Longhorn motif was carried out by the title of the book, "A New Texas Brand," and set off by a border of actual Longhorn cattle brands along with a branding iron.



Another of the "Longhorn" advertisements

Hundreds of telegrams from building material dealers and contractors throughout the state ordering the new brand of cement are indicative of the splendid pulling power of the campaign.



To Build the Texas of Tomorrow

We are proud that it will be our privilege to supply a product to be used in building the Texas of Tomorrow. Today Texas is the world's greatest empire of opportunity. Tomorrow we will see the realization of the opportunities offered today.

On every side in every industry there is activity, inspiration and an advance which proves that Texas has entered upon an era of progress and prosperity far beyond even the dreams of its own people, many of whom are amazed at the things that are going on all about them.

In such an advance the building industry plays an increasingly important role. It must build the skyscrapers, the industrial plants, the broad highways, the bridges, the dams, the farm buildings and the thousands of [illegible] that are an integral part of progress.

To that industry we are proud to offer our product, our services and our facilities. It will be our pleasure to work with them and for them in the building of the Texas of Tomorrow.

The ownership and management of the Republic Portland Cement Company is vested in citizens of Texas who have lived and worked among the building fraternity of Texas for many years and whose policies have been formulated in accordance with local conditions and to insure the progress of the industry.

Our product, LONGHORN PORTLAND CEMENT, in its very name carries a pledge to the Texas of Tomorrow ... a pledge of exacting standards of quality in every detail of manufacture and distribution ... a pledge that it will always keep pace with progress, regardless of how far that progress may lead.

REPUBLIC PORTLAND CEMENT COMPANY
Offices Smith Young Tower San Antonio Texas
Plant Longhorn Texas

PORTLAND CEMENT

To such "copy" as this is undoubtedly due a large part of the inquiries received by the Republic Portland Cement Company

Starting anew . . . with an unfamiliar public and an entirely newly created product, the name Longhorn portland cement is today one of the most discussed, widely known popular cements in use in Texas.

New Cells to Be Built at Chelsea State Cement Plant

The Michigan state prison commission has approved plans submitted by the state construction engineer for a cell block at the Chelsea cement plant to house over two hundred prisoners. The estimated cost was placed at $40,000.

The commission hesitated to act because of the indefinite status of the state cement industry. It was informed, however, that the cell block could be constructed at the state prison shops at Jackson and of such a type that it could be moved if necessary.

Northwestern States Plant Raw Material Department Resumes Operation

The Northwestern States Portland Cement Company at Gilmore City, Iowa, has resumed work in its quarry and rock crushing departments.

Great Britain's Cement Industry in 1928

British Exports Show Increases of 66 and 20 Per Cent Over Two Preceding Years, Respectively — Imports Lower Than in 1927

BRITISH exports of calcareous cement for the year ended December 31, 1928, amounted to 5,422,872 barrels with 4,491,894 barrels in the corresponding period in 1927 according to the Bureau of Foreign and Domestic Commerce of the Department of Commerce. In 1926 the total exports were 3,370,351 barrels, so that in comparing the 1928 export trade with the two preceding years, there is an increase of 20 per cent as compared with 1927, and of 66 per cent as compared with 1926. Cement imports during 1928 (1,645,377 barrels) were less than one-third of exports.

The heaviest shipments in 1928 were to the Irish Free State. British India has in past years been the best market for British cement, but in 1928 it took fourth place, the second best buyer being British West Africa, and the third best the Straits Settlements and Malay States, the latter having imported considerably increased quantities. Decreases occurred in exports to South Africa and India.

The following tables give the cement exports for the year ended December 31, 1928, compared with the exports for the preceding years:

Country	1926 Bbls.	1927 Bbls.	1928 Bbls.
Netherlands	62,793	6,559	88,056
Brazil	185,292	232,144	325,645
Argentina	79,103	149,473	190,332
Irish Free State	536,952	678,187	785,538
British West Africa	415,846	583,303	716,025
British South Africa	87,794	31,787	23,768
British India	428,445	688,690	607,977
Straits Settlements	192,984	355,400	632,002
Australia	107,113	109,496	120,135
Other Countries	1,174,029	1,655,855	1,933,392
Total	3,270,351	4,491,894	5,422,870

The foregoing figures show that there has been an increase in exports of 930,978 barrels when comparing 1928 with 1927, and of 2,152,520 barrels when comparing 1928 with 1926.

Imports

Imports of cement in the year 1928 fell to 1,645,377 barrels, as against 2,484,581 barrels in 1927, and 1,196,289 barrels in 1926.

Countries of origin are not given in connection with imports in the available trade returns.

Important Events of the Year

In reviewing recent events connected with the British cement industry an outstanding feature has been the growing importance of a number of newer cement undertakings which have come under the control of the British Cement Products and Finance Company. Formerly the cement industry was practically represented by the one great combine, the Associated Portland Cement Manufacturers, and its associate, the British Portland Cement Company. The coming into the market of the group under the British Cement Products and Finance Company has brought about revolutionary changes in the British industry. A plan has been gradually evolved so that the industry has been spread throughout the country in a sort of regional distribution, so that at the present time there is hardly a part of England not served by a modern cement-making plant and the elimination of unduly heavy transport charges has been made possible. The two groups have, during the year, adopted a system of co-operation designed to eliminate any wasteful price-cutting in the future.

According to the "Stock Exchange Gazette" of November 23, 1928, it is estimated that the numerous cement-manufacturing companies in Great Britain have a total output of approximately 30 million barrels per annum.

Reference to the import and export figures above will show that the great proportion of the cement made in Great Britain is for home consumption.

Ideal Plant at Arkansas Begins Production

The first kiln in the new plant of the Arkansas Portland Cement Company at Okay, Arkansas, was put into service in the middle of August and the second unit was scheduled to go into operation late in September. Simultaneously with news of the beginning of production, announcement was made that the capacity of the new mill will be doubled immediately, bringing it to 4,500 barrels daily.

A record quarry shot for the section was made August 11th, when more than a carload of dynamite was used for one charge.

The plant will supply virtually the entire requirements for the million dollar road building program scheduled by Arkansas for the current year. The company also has a $400,000 contract to supply Louisiana for a road construction project.

The Arkansas company is a subsidiary of the Ideal Cement Company. The plant was designed and built under the direction of Paul C. Van Zandt.

Lehigh Earnings

The Lehigh Portland Cement Company reports a net income for the twelve months ended August 31st, of $3,676,051, after depreciation and federal taxes. After deduction of preferred dividends the balance of $2,167,854 is equal to $4.81 a share on the 450,348 common shares.

Atlas Plant Reopens

The second unit of plant No. 5 of the Atlas Portland Cement Company at Hannibal, Mo., resumed operations September 10th. The first unit was put into operation August 28th, the plant having been closed for some time.

German Production Costs in 1928 Above World Market Levels

Unfavorable Economic Conditions Compel Plants to Operate Greatly Under Capacity—Internal Competition Aids Industry—Syndicates and Cartels

AS was the case in 1927, the turnover in the German cement industry in 1928 exceeded that of prewar years, amounting to approximately 49,249,200 barrels, but it is not abreast of the increased consumption in other countries, a bulletin issued by the Bureau of Foreign and Domestic Commerce of the Department of Commerce states. Exports of 6,221,798 barrels were 677,423 barrels less than the 6,899,220 barrels sold in the preceding twelve months' period. Imports, chiefly from Belgium and France, for the year of 1928 were more than twice the 1927 figures; 845,521 barrels as against 2,357,008 barrels.

Internal Economic Conditions Affect Production

This apparent slow recovery, coupled with unfavorable economic developments, i. e., money tightness and the retardation of the internal building construction against demand, compelled the works to operate greatly under capacity; thus largely driving production costs (of an estimated increase of 8 per cent) above world market levels, with cement prices remaining steady throughout the year.

There were a number of factors directly responsible for the increased production costs, among which were the shortening of labor shifts, increased wages, and increases in the price of coal and iron, with advances in freight charges and taxes; the last having a very appreciable effect upon the industry as a whole.

The wages in the industry have more than doubled since 1913, with production increasing by 40 per cent, or from 266 tons in 1913 to 370 tons per man per year in 1926. In many plants wages form the largest part of total manufacturing costs, though partly augmented by employees' social insurance and thus it is clear that the slightest increase in wages must be reflected in production costs. The wage level in 1926 was 73 per cent higher than in 1913 and 51 per cent higher than in 1924; but, by the greater use of machinery, it has been possible to lower in some degree, the percentage for wages relative to the manufacturing cost, with each succeeding year. It is maintained, therefore, that this feature of production, together with those of proportional depreciation of machinery and plant as well as slack demand, precluded the possibility of raising prices despite technical economies.

Competition Tending to Strengthen the Industry

Internal competition, while largely under the control of four syndicates, became very marked during the year. The satisfactory dividend payments of the principal companies, resulting in the building of new plants by independents, and the growing demand and output of the portland-iron cement phase of the industry, has been largely responsible. It is felt that this enlargement cannot be checked, because of the financial strength of the concerns involved and the fact that the products are derived from waste. Although this kind of product necessitates heavy storage expenses and the utilization of much space, the close relations between the coal mining and smelting industries have provided a cheaper fuel supply, resulting in considerable saving in an essential raw material.

The process of concentration during 1927 and 1928 continued to progress and should contribute considerably to the strengthening of the cement business. The amalgamation of the individual firms proceeded similarly in the three quota districts (syndicate districts), so that in practice, the syndicates now consist of relatively few members. The financial status of this industry with the close of the year may be considered as satisfactory. Efforts were made to rationalize the works still more than in the past and to exploit the electrical constructions. The value of the latter plants shows a tendency to increase.

International Agreements

The outstanding international cement agreement of the year was the German-Belgian-Dutch agreement regarding the Dutch market, concluded late in 1928, which provided for sales quotas of 40 per cent each to Germany and Belgium with the remaining 20 per cent to Holland. As for reported cement cartel negotiations between Germany and France on the one hand, and Germany and England on the other, no definite basis of agreement has been reached in the first case, while in the second (German-British), private relations have been strengthened only between companies. Negotiations with France were still pending with the close of the year.

Total Exports and Imports of Cement for Germany in Barrels of 376 Pounds

	1913	1926	1927	1928
Exports	6,622,964	5,677,377	6,899,221	6,221,804
Imports	987,959	350,232	403,014	845,620

Exports of cement from Germany are given by countries for several years in the following comparative table. It will be noted that the figures for 1928 in the cases of the Netherlands and Argentina show a substantial increase over those of 1927, with a general falling off to other countries. Imports were more than double those of 1927 with an approach to the pre-war year of 1913.

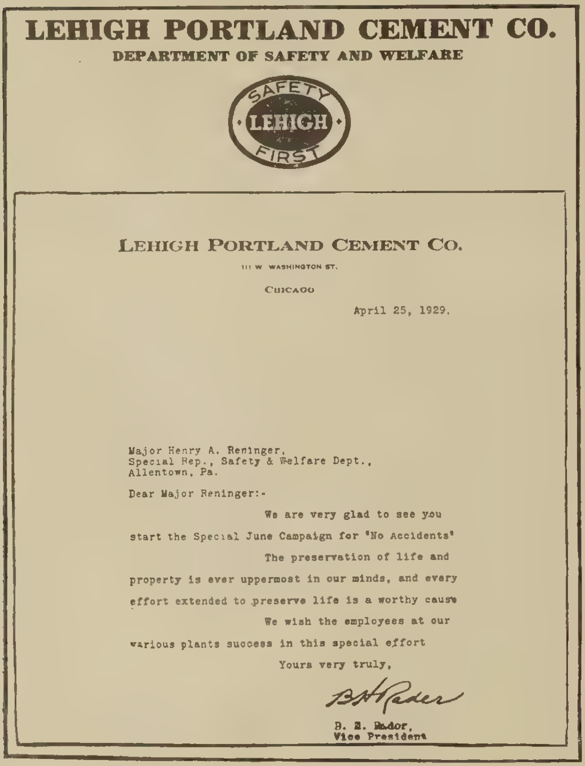
Chief Markets for German Cement in Barrels

Country	1913	1926	1927	1928
Netherlands	950,212	1,922,569	2,410,942	2,451,526
Brazil	1,043,884	880,737	890,678	699,896
Argentina	392,764	473,372	464,584	559,512
Chile	500,192	242,910	323,632	275,784
Dutch Indies	387,171	176,761	289,239	194,962
Sarr Territory		270,063	266,450	190,882
Columbia		105,153	265,588	118,356
British India		119,171	176,347	145,602

Texas Cement Yield Shows Increase

Portland cement production in Texas for June was 554,000 against 540,000 in same month of last year and for first half year 3,223,000 barrels compared with 3,103,000 in like time of 1928. Shipments in June totaled 570,000 barrels, gain of 6,000 over same month last year. In first half, 3,236,000 barrels were loaded, gain of 2.6 per cent over 3,153,000 barrels shipped during similar period last year.

Some Posters Used at Lehigh Portland Cement Co. Plants During the June Safety Campaign



LEHIGH PORTLAND CEMENT CO.
DEPARTMENT OF SAFETY AND WELFARE

LEHIGH PORTLAND CEMENT CO.
111 W. WASHINGTON ST.
CHICAGO

April 25, 1929.

Major Henry A. Reninger,
Special Rep., Safety & Welfare Dept.,
Allentown, Pa.

Dear Major Reninger:-

We are very glad to see you start the Special June Campaign for "No Accidents"

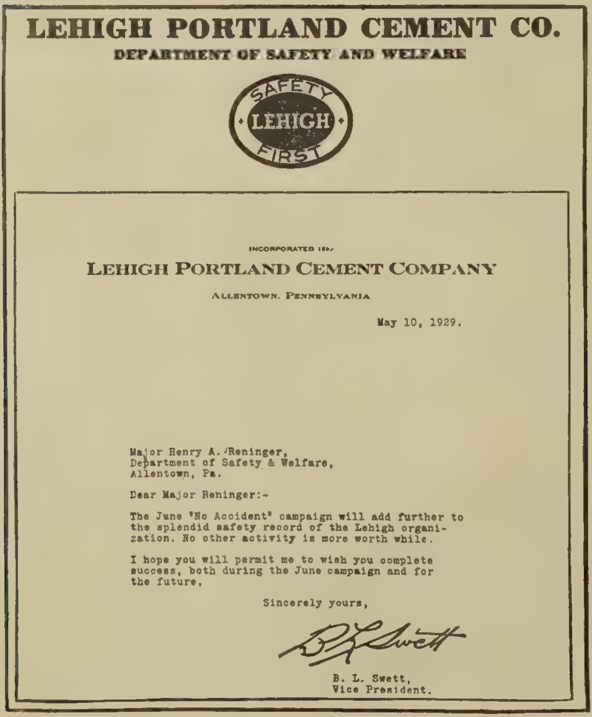
The preservation of life and property is ever uppermost in our minds, and every effort extended to preserve life is a worthy cause

We wish the employees at our various plants success in this special effort

Yours very truly,

B H Rader

B. H. Rader,
Vice President



LEHIGH PORTLAND CEMENT CO.
DEPARTMENT OF SAFETY AND WELFARE

INCORPORATED 1897
LEHIGH PORTLAND CEMENT COMPANY
ALLENTOWN, PENNSYLVANIA

May 10, 1929.

Major Henry A. Reninger,
Department of Safety & Welfare,
Allentown, Pa.

Dear Major Reninger:-

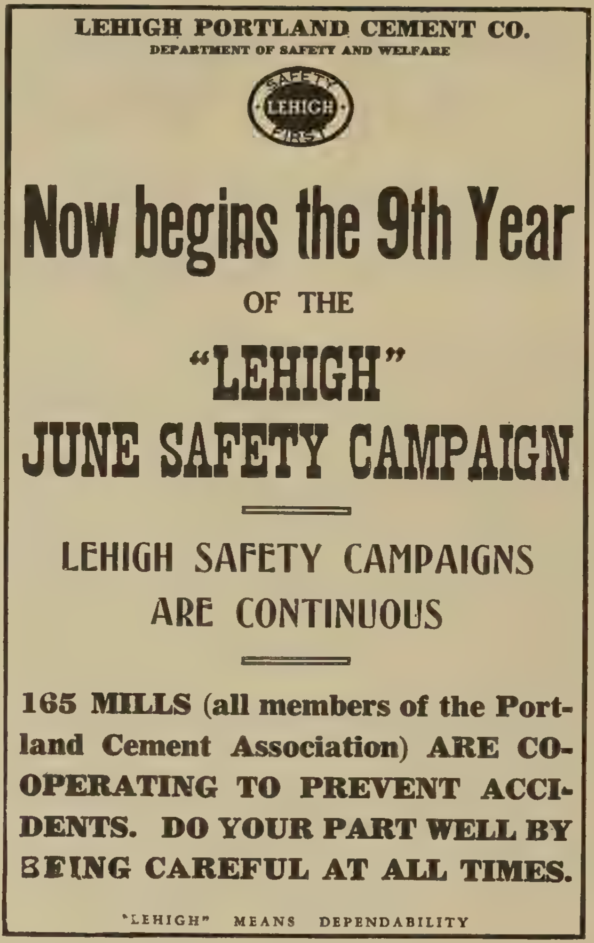
The June "No Accident" campaign will add further to the splendid safety record of the Lehigh organization. No other activity is more worth while.

I hope you will permit me to wish you complete success, both during the June campaign and for the future,

Sincerely yours,

B L Swett

B. L. Swett,
Vice President.



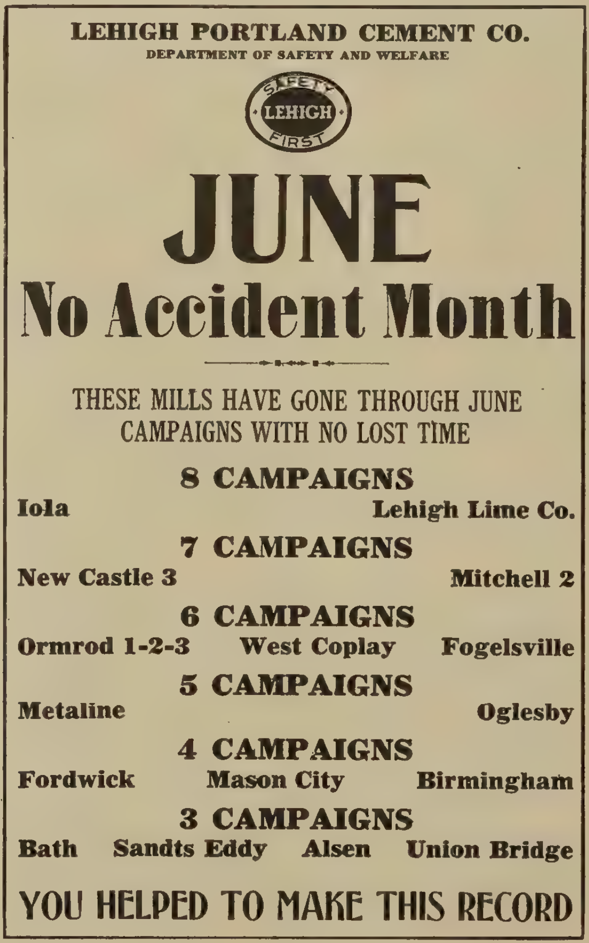
LEHIGH PORTLAND CEMENT CO.
DEPARTMENT OF SAFETY AND WELFARE

Now begins the 9th Year
OF THE
"LEHIGH"
JUNE SAFETY CAMPAIGN

LEHIGH SAFETY CAMPAIGNS ARE CONTINUOUS

165 MILLS (all members of the Portland Cement Association) ARE CO-OPERATING TO PREVENT ACCIDENTS. DO YOUR PART WELL BY BEING CAREFUL AT ALL TIMES.

"LEHIGH" MEANS DEPENDABILITY



LEHIGH PORTLAND CEMENT CO.
DEPARTMENT OF SAFETY AND WELFARE

JUNE
No Accident Month

THESE MILLS HAVE GONE THROUGH JUNE CAMPAIGNS WITH NO LOST TIME

8 CAMPAIGNS
Iola **Lehigh Lime Co.**

7 CAMPAIGNS
New Castle 3 **Mitchell 2**

6 CAMPAIGNS
Ormrod 1-2-3 **West Coplay** **Fogelsville**

5 CAMPAIGNS
Metaline **Oglesby**

4 CAMPAIGNS
Fordwick **Mason City** **Birmingham**

3 CAMPAIGNS
Bath **Sandts Eddy** **Alsen** **Union Bridge**

YOU HELPED TO MAKE THIS RECORD

~~ EDITORIAL ~~

Plastic Cements

ONE of the notable changes in the cement industry during the past few years is the gradual change in the mental attitude of those responsible for the operation of the plants. Traditional, rule-of-thumb methods are slowly but surely giving place to the scientific or engineering method of solving problems. More and more the chemist is becoming supreme in the control of quality and the engineer is supplanting the "operating man" as a necessary factor in determining, from a scientific standpoint, the best methods of securing the results desired mechanically.

There are still many investigations needed into the physical and chemical problems of cement making and in extending or refining the control of mechanical processes. The very nature of the work of chemists, mill superintendents and operating officials brings up questions that require research. Comparatively little is written and published regarding these problems. Generalized information often does not apply to specific conditions. There is no alternative but to dig into the problem and to make such researches as are needed to arrive at the solution of the problem.

As a result there are innumerable facts of tremendous value to other engineers and chemists hidden away in the files. In the results of these seemingly minor studies there are often truths and principles that are of fundamental importance to the industry as a whole. It is a well-known fact that practically every discovery of fundamental importance has been made by some individual working in his own laboratories.

There is still much of the old-fashioned idea of the necessity of "secrecy" among cement manufacturers. Why that should be in the present condition of the industry is difficult to understand in the light of the experiences of other industries that have benefitted from abandoning such short-sighted policies. But the cement industry still, in a large measure, suffers the drag of this old bugaboo and is bound by the fear that others will find out what one company has discovered.

The result is that all these valuable individual researches are hidden in the files instead of being made available to the industry as a whole. It is a short-sighted policy that hugs its own mite and thereby shuts out the wealth of information gathered at other plants.

Individual Research

THE aims of designers and contractors must be taken into account in determining the types of cement that the manufacturer must supply to the buyer and what he must be prepared to supply in the future. For the cement industry, like any other, is a matter of economics in which cement technology must be considered primarily as a means of increasing sales.

Contractors and engineers have a decided preference for plastic cements that produce workable mixtures. Users of cement, through their technical societies, have given the matter of workability of concrete much thought. They have tried to find dependable methods for measuring workability; they have studied the effect of proportioning, size of aggregates, etc., on workability and they have investigated the effects of admixtures to determine their influence on the workability of concrete.

Because, with the present low water content concrete, workability has become a matter of importance to users, it must be admitted that the working qualities of a cement have an important bearing on marketing.

To date research has done little to develop methods for producing within the cement itself those qualities of plasticity that are now usually secured through the use of admixtures which are added either to the cement itself at the mill or to the mix on the job. Yet investigations have shown that there is a wide diversity in the plasticity of mortars due to the cement itself.

There are, at present, a large number of brands of "plastic" cement on the market that are sold primarily on the basis of their ability to produce workability. Other cements are marketed with plasticity as a secondary quality due to the use of admixtures that have some other quality such as waterproofness as their primary sales appeal.

The demand for plastic cements and the advantage of shipping "mixed cars" of standard and plastic cements have brought manufacturers into this field. Because practically all of the plastic cements have standard portland cement as their major constituent, the problem of classifying such cements and of providing the user with dependable information regarding them is a direct responsibility of the portland cement industry as a whole. The day of diversified types of cement is at hand and it is the duty of the cement industry to guide their development and to provide dependable information regarding them to the user.

The Effect of Calcium Chloride on Some of the Physical Properties of Portland Cement

A Report of Experiments Made in Japan to Determine the Effect of Calcium Chloride in Accelerating the Hardening of Portland Cement

By S. UCHIDA

THE use of calcium chloride for hastening and accelerating the hardening of portland cement has attracted considerable interest during the past few years. Previous investigations had shown that calcium chloride was probably the most effective means for this purpose. An investigation of the effect of such chemical admixtures on the physical properties was begun by the Cement Research Laboratory of the Sendai Higher Technical School, Japan, three years ago and has been continued up till the present. Since then, using different percentages of calcium chloride, the setting time under varying conditions of consistency and temperature, and the tensile strength at different ages, for a wide range in proportion, to water content, and storage has been observed. The cement used in these tests was furnished by the Asano Cement Co., of Hokkaido, Japan. The aggregate for mortar consisted of sand from the River Hirose, graded 0.0027 to 2.29 millimeters. Calcium chloride, which contained about 70 per cent of $CaCl_2$ with a small amount of impurities, was purchased at Sendai.

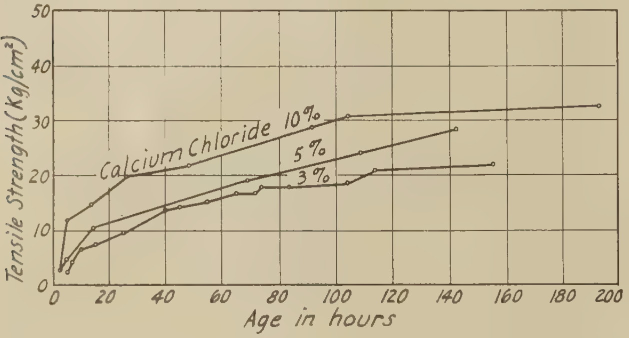


Fig. 1. The relation between tensile strength and age for three different percentages of calcium chloride

The chemical analysis and fineness of the cement were as follows:

Chemical analysis	
Silica	23.32
Alumina	6.39
Iron oxide	2.13
Magnesia	2.06
Lime	64.04
Sulfur trioxide	1.12
Ignition loss	0.98
Insoluble matter	0.46

Fineness	
Sieves	Residual Per cent
900 holes/sq. cm.	0.25
2500 holes/sq. cm.	0.47
4900 holes/sq. cm.	1.10

In testing the setting time of portland cement Vicat's needle was used because it is the most accurate instrument for determining the setting mechanically and the results were checked by the writer's setting-time measuring apparatus, the observation with which is made chemically, by the differential method.

Calcium chloride differing in percentage in each case was mixed with portland cement up to 30 per cent, the quantity of water for gauging neat cement paste is 30 per cent by weight and the temperature of the room during the test varies from 15 deg. C. to 16 deg. C.

Below are the results, in the case of each percentage admixture, at the above temperature:

Percentage of calcium chloride	Setting time			
	Initial set		Final set	
	Hrs.	Mins.	Hrs.	Mins.
None	3	40	7	42
1	Flash		4	55
3			3	33
5			2	49
7			1	45
10				50
15				25
20				28
30				30

The mortar specimens were made in accordance with the standards of the Japanese government for portland cement testing. The investigations were primarily tests of the effect of calcium chloride on the tensile strength of 1:3 mortar made and stored under temperatures 15 deg. C. to 17 deg. C. The results of the test are as follows:

3% of calcium chloride (by weight)		5% of calcium chloride (by weight)			7% of calcium chloride (by weight)	
Age (hours)	Tensile strength*	Age		Tensile strength*	Age (hours)	Tensile strength*
		Hrs.	Mins.			
5	2.25	3	35	3.40	2	2.56
7	4.42	15		10.08	6	11.83
10	6.28	42		12.01	14	14.17
16	7.36	45		13.95	26	19.92
25	8.60	70		18.14	49	21.50
40	13.56	76		18.76	92	28.68
55	14.88	109		23.79	104	30.23
65	16.67	142		27.96	193	32.94
72	16.78					
74	17.36					
84	17.83					
104	18.38					
114	20.85					
155	21.66					

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*Kg./sq. cm.

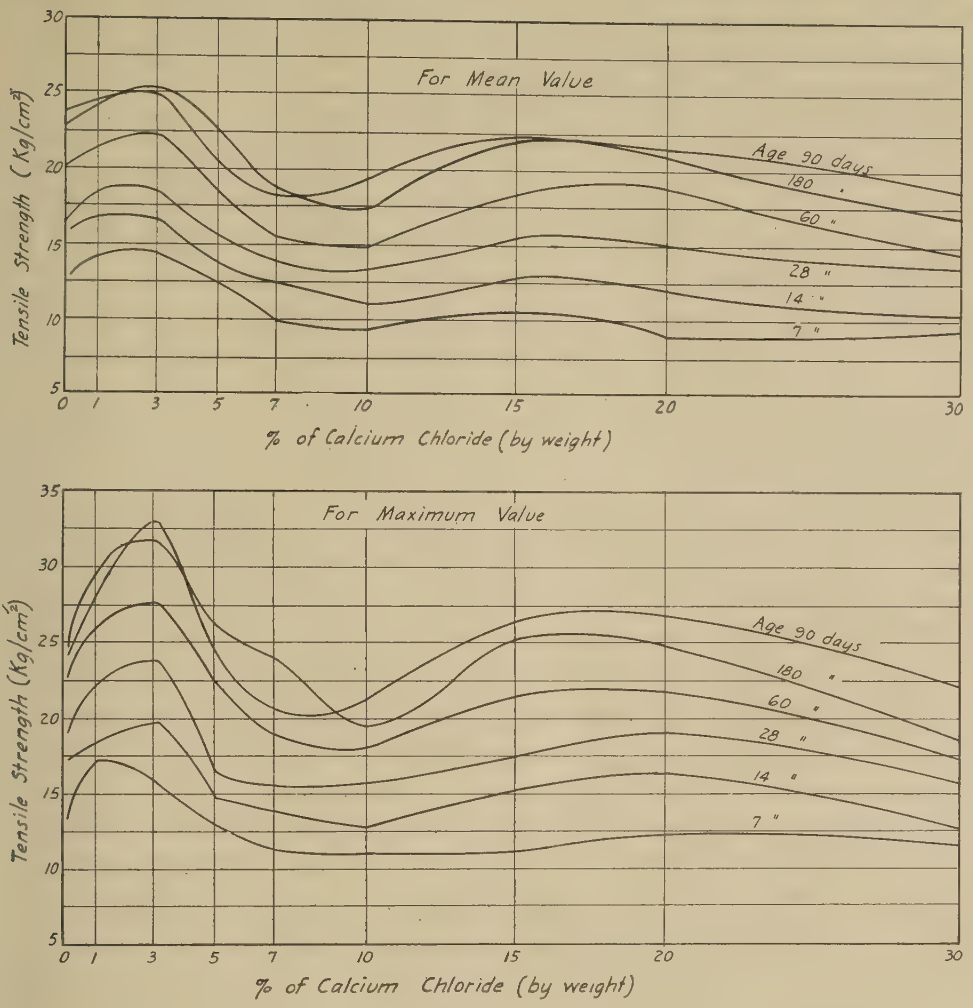
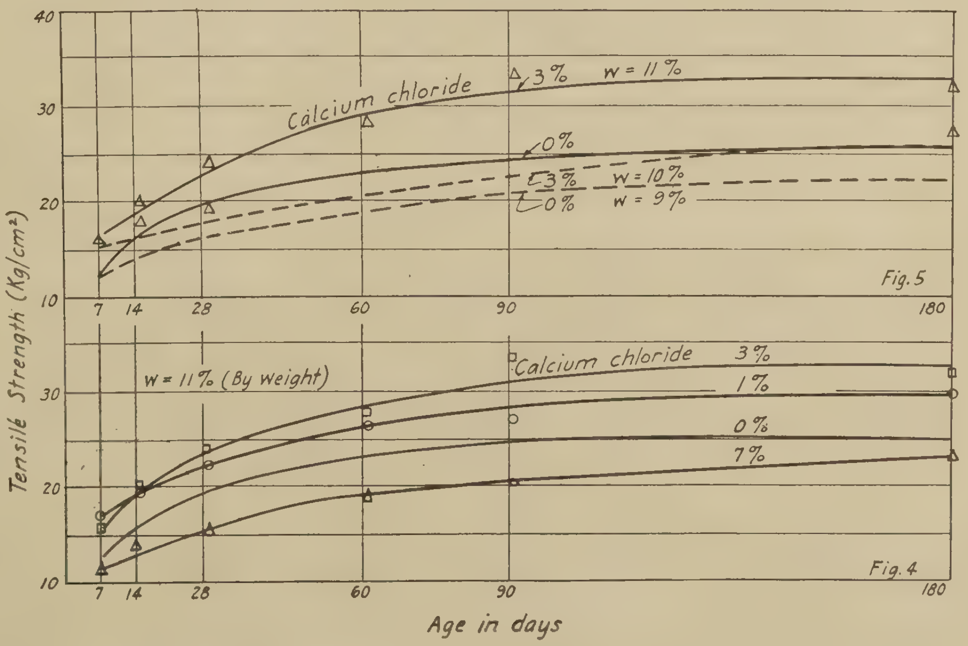


Fig. 2. Showing the relation between the tensile strength and calcium chloride, per cent in proportion to weight of cement, at ages of 7 days to 180 days

Next the relation between the amount of calcium chloride and the tensile strength for three different percentages of gauging water was investigated. The results of the test are those given in the table on the following page.



Figures 4 and 5. The effect of calcium chloride on the tensile strength of mortar, as influenced by age of test, and effect of consistency and calcium chloride on the tensile strength of the mortar, as influenced by age of test (Figure 3 appears on the following page)

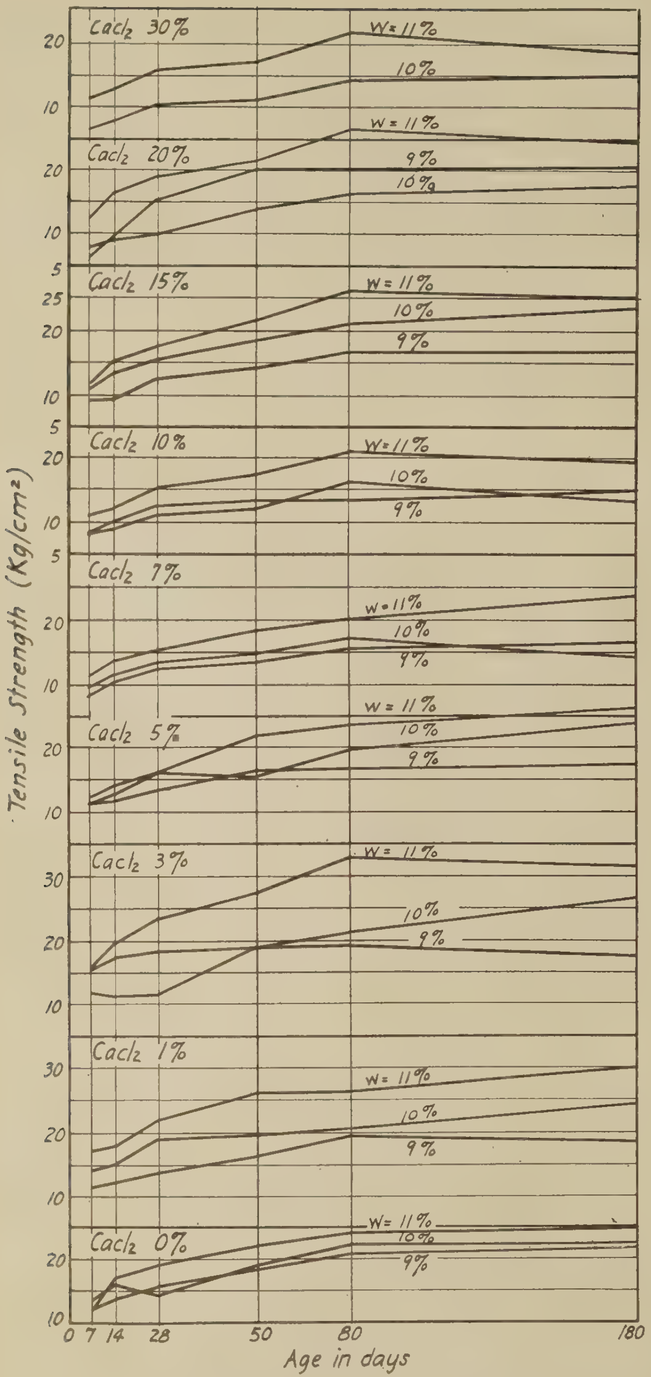


Fig. 3. The effect of age on the tensile strength of the mortar for three consistencies (9, 10, and 11 per cent)

The principal conclusions from the test are:

1. Calcium chloride when used within certain limited proportions accelerates the setting and hardening of cement and gives increased strength to cement and mortar.

Percentage of calcium chloride	Time Required to have 10 kg./sq. cm. of tensile strength after gauging the mortar
10	5 hours
5	15 hours
3	27 hours

2. Calcium chloride use increased the tensile strength of the mortar approximately in proportion to the amount used up to a 2 or 3 optimum percentage; the strength became less for further additions. Beyond a 4 critical percentage further additions produced a reduction in strength, as compared with similar mortar without these admixtures.
3. The addition of calcium chloride produced an increase in mortar strength that was practically constant at all ages.
4. The increase in strength due to addition of calcium chloride is parallel with the age.
5. The effect of calcium chloride on the strength of the mortar gauged, using different percentages of water at normal temperature, was greater in the case of a mortar of a wet consistency than in that of a dry consistency.

RELATION BETWEEN AMOUNT OF CALCIUM CHLORIDE AND TENSILE STRENGTH

Pct. of chloride, by wt.	Pct. of water, by wt.	Tensile strength (Kg./sq. cm.) Age in days 7	14	28	60	90	180
	9	12.06	14.00	15.60	18.65	21.00	21.80
0	10	13.35	16.22	14.83	19.32	22.57	22.79
	11	12.48	17.13	19.30	22.45	24.50	24.35
	9	11.70	12.47	14.00	16.50	19.40	18.70
1	10	14.40	15.22	19.00	19.84	20.60	24.34
	11	17.05	18.45	22.19	26.10	26.40	30.00
	9	12.15	11.63	11.78	19.52	19.70	17.20
3	10	15.08	17.90	18.71	19.06	21.32	26.50
	11	15.80	19.63	23.80	27.60	33.00	31.90
	9	11.79	12.09	13.48	16.18	16.69	17.30
5	10	11.90	12.93	16.46	15.96	19.69	23.80
	11	12.92	14.61	16.20	22.21	23.98	25.97
	9	8.06	10.53	12.16	13.12	15.78	16.02
7	10	9.90	11.89	13.17	14.25	17.60	14.16
	11	11.32	13.91	15.50	18.70	20.43	23.88
	9	8.37	------	12.23	13.72	13.72	15.10
10	10	8.45	9.17	11.40	12.18	16.65	13.25
	11	11.11	12.60	15.85	17.90	21.13	19.46
	9	9.15	9.59	12.75	14.26	17.00	16.50
15	10	11.00	13.62	15.60	18.54	21.22	23.40
	11	11.13	15.22	17.50	21.50	26.38	25.20
	9	6.40	9.98	15.13	20.38	20.60	19.90
20	10	8.22	9.31	10.18	14.02	16.50	17.11
	11	12.32	16.43	19.30	21.80	26.86	24.82
	9	--------	--------	--------	--------	--------	--------
30	10	6.58	7.97	10.60	11.05	14.58	15.03
	11	11.65	12.80	16.11	17.50	22.40	18.52

The important conclusions from the tests may be summarized as follows: In the use of calcium chloride no advantage was gained for percentages of the commercial product greater than 2 or 3 per cent of weight of cement.

The addition of 3 per cent of calcium chloride to cement, of the consistency ordinarily used, produced an acceleration in the setting time of 45 per cent.

Boiler Corrosion

When boiler corrosion is below the water line it generally indicates that acid is contained in the water. And when the corrosion is above the water line it usually indicates that the water contains considerable air.

A method recommended for preventing corrosion is to cover the surface of the boiler both above and below the water line with a thin lime coat. Soda ash in small quantities introduced in the feed water may also be helpful.

If corrosion is considerable, feed water specialists should be consulted.

Prague Firm Reports Profits

The Czechoslovakian cement firm, Societe Anonyme pour la Fabrication du Ciment, at Prague, announces a net profit of 116,000 crowns ($34,800) during 1928 and, for the first time, will declare a dividend of 5 per cent.

Eliminating the Screw Conveyor Accident

How the Accident Toll Reaped by One of the Most Hazardous Units of Cement Plant Equipment May Be Reduced—Appliances to Insure Workmen's Safety

By M. S. HUMPHRYES
Mechanical Engineer, Universal Portland Cement Company, Chicago

THE screw conveyor is particularly dangerous to human life and limb and from the earliest days of its use has contributed heavily to the record of accidents in the cement business, many of which have ended fatally.

During the past decade very careful attention has been given to this device, with the idea of eliminating all the dangerous features and making it as safe for the workman as human science will permit.

Factors in Prevention of Accidents

In solving the problem of screw conveyor accidents there are three important facts to be considered.

1—The mechanical construction of conveyors and covers.

2—Safety appliances applicable to the employee.

3—Good housekeeping and safety education of the employee.

There are in general three types of screw conveyor construction. The type used for standard installations, that is for all ordinary uses and at points readily accessible for its operation and maintenance, is built so that the cover will fit over angles fastened to the box proper, like the lid of a box or pail. This allows the dust to be retained by the angles and forms a seal that prevents dust leakage into the atmosphere. Straps are riveted to the cover at convenient points, usually two to a cover, and through the ends of these straps bolts are placed to hold the covers down tight to the conveyor box and hold it securely against removal under ordinary circumstances and yet presents the minimum of labor required in removal for repairs. The covers are normally made about four and one-half feet long, which makes them easy to handle.

The second type of construction is used in tunnel installations where the head room is limited. In this type the flat cover is bolted directly to the conveyor box every 12 inches and necessarily requires more labor and time in making repairs.

The third type is used in special cases where it is essential to have a large area over the screw for ventilation purposes and this space is very effective in eliminating dusty conditions around a cement mill, especially when connected to a dust ventilating system. The cover used on this type can be the same as the first mentioned types, depending of course on the conditions surrounding its installation. Our experience has proven that these types of construction are very effective in providing a safe means of conveying materials to different points of the mill and have reduced screw conveyor accidents to the minimum.

Suggested Appliances

There are many appliances applicable to the safety of the employee which are used without detriment to good operation, a few of which follow. When it is necessary to shut down a conveyor for repairs the first act of the handyman after the switch is thrown is to place a padlock, with which every man is supplied, on the motor switch so that the motor cannot be inadvertently started by another employee, not knowing that the conveyor is down for repairs. This rule is strictly enforced and is applicable to all types of machines that are shut down for any cause whatever, either mechanical, electrical or operating.

Where it is necessary to return the spillage and sweepings from the floor to the conveyor, for return into the process, an opening is cut in the cover around which an angle retaining ring is placed and into the opening is bolted a screen or grating of such design that it is impossible for an employee to get his hand or foot through it; cover is then placed over the opening like the cover on a pail, which is easily removable. In this way a convenient and safe method is provided for clean up without removing the main cover of the conveyor box, which would introduce a very serious hazard.

Sampling from conveyors while in operation is prohibited and where it is necessary in the process to take samples, special sampling devices are provided. These have proved effective in eliminating accidents.

In silos and bins where it is necessary at times for men to enter, the screw conveyor hazards have been eliminated by placing the conveyor below the floor level, the same being connected to the bin by means of spouts through the floor. This construction will not allow the entrance of the human body beyond the safety point should the workman accidentally fall near or into the spout.

Necessity for Order

Good housekeeping and safety education are most essential to the safety of the employee. The practice of allowing dirt and rubbish to accumulate in large or small quantities on conveyor boxes and lids and around the floors is strictly prohibited, as these not only present an untidy condition, but offer an obstruction to stumble over and often conceal defective or loose conveyor covers.

Clean surroundings encourage the workmen to wear better clothing and inspire him to do better work, more safely, and such a condition will surely show an increase in man power production.

The personal safety of the workman is based on plant spirit and plant safety. In order to teach him to work safely he first must be sold on the company for which he is working, he must have the plant and safety spirit and

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From a paper being presented at the Cement Section of the National Safety Council Congress at Chicago, Illinois, October 2nd.

must co-operate and have the co-operation of his fellow employees.

Once a workman has the spirit, he is ready to accept safety at its true value, to be educated and schooled along the lines of safety and to put forth all his efforts toward that end. He must be wide awake and alert at all times, and he will think twice before placing his hands or any other part of his body near a moving conveyor or allowing a fellow employee to do likewise.

All the mechanical devices that can be applied to a machine for the safety of the workman will be of no avail unless that workman is thoroughly educated in their use and in the safety spirit, keeps his eyes open, and uses his head in the course of attending to the operation of the machine.

A thinking workman will seldom leave a motor switch unlocked or leave the lid off the conveyor box, thereby setting a trap for others that follow him.

First Aid Training

Methods Pursued by Bureau of Mines in Spreading First Aid Knowledge—Certificates Awarded—Interest Aroused by Contests—Key Employees Instruct Fellow Workmen

By J. J. FORBES and R. D. CURRIE
Bureau of Mines, Department of Commerce

THE first-aid course prescribed by the Bureau of Mines consists of 15 hours' instruction consisting of lectures and practicum. It goes into details on the anatomy of the human body, the respiratory system, the vascular system, and the nervous system.

Instructions are given in caring for the injured, in artificial respiration, control of bleeding, dressings for open wounds, dressings for fractures and dislocations, dressings for burns, treatment for shock, and transportation of the injured.

At the completion of the course, which generally requires five lessons of three hours each, the Bureau of Mines issues a certificate to those who have successfully completed the course. Since 1910 and to July 1, 1929, 316,421 certificates have been issued.

In some states the Department of Mines also issues certificates to miners trained in first aid by their instructors, and it is becoming a practice among some of the larger companies to issue company first-aid certificates to their employees who have been trained in the work.

Contests Stimulate Interest

First-aid contests have been thought to be one of the best means for stimulating interest in first-aid training, and as a result many contests are conducted each year. These affairs are sponsored by the various companies, state departments of mines, the American Red Cross, and the United States Bureau of Mines. Probably the most outstanding of these competitive meets is the international contest. Last year 46 teams from 17 different companies located in 11 states competed at this contest. In some cases these teams were selected as the best, through elimination contests, from 60 or more teams. Prizes, many of them elaborate, are offered at these contests for the winning teams.

In the spring of 1923 a new idea in first-aid training was started at Thomas, W. Va., for the Davis Coal & Coke Co. This is known as the 100 per cent plan and consists of training every employee of a mine or plant. During the past year in which more than 79,000 men were trained in first aid by the Bureau of Mines, about 40 per cent of them were trained under the 100 per cent, or co-operative, plan.

Plant Men Instruct Co-Workers

Under this plan a group of "key-men" are trained as instructors by the bureau. These key-men are employees who have been selected for their knowledge of first aid, ability to teach, and ability as leaders. Their training as instructors generally requires two weeks of intensive work, at the end of which time the employees of the entire plant are divided into groups of 15 to 20 men and an instructor is appointed to each group. The instructors train their respective groups in the bureau's methods of first aid under the direct supervision of a bureau instructor. In this way large groups of employees can be given individual instructions in first-aid methods and the results obtained are much better than where large classes are conducted by a Bureau of Mines instructor alone.

At the completion of the classes the groups are examined by the bureau men, and those who have passed the course are granted a Bureau of Mines certificate.

There are several advantages in conducting the training of the 100 per cent plan, as follows:

1. Competent instructors are provided for the plant.
2. Small groups or classes assure individual attention.
3. Large plants can be completely trained in a comparatively short time.
4. An active spirit of co-operation and fellowship is sponsored by the plan.
5. A nucleus of competent instructors is left at the plant so that the interest in first-aid does not leave with the Bureau of Mines rescue car or instructor as is generally true under the other plan.

At the annual meeting of the Portland Cement Association held in Chicago in November, 1928, tentative plans for first-aid training of all employees in the plants of the association were made by A. J. R. Curtis, assistant to the general manager of the association, and D. Harrington, chief engineer of the safety division of the Bureau of Mines. This work was started in the early spring of 1929, and to date a total of 6,795 men have been trained for the cement association. This training was scattered over 26 states.

From a paper being presented at the Cement Section of the National Safety Council Congress at Chicago, Illinois, October 2nd.

During this campaign of first-aid training, eight plants were trained 100 per cent and were awarded 100 per cent certificates by the Bureau of Mines. Most of the training was done on the 100 per cent plan so that this association is now quite capable of carrying on its own initial first-aid training. The bureau will gladly co-operate with plants of this association in examining classes trained by plant instructors for Bureau of Mines certificates.

Advantages of Training

Some of the advantages to be expected from first-aid training are that:

1. A man who has been trained in first aid is generally a safer man after receiving the training because he has been made to visualize serious personal injuries.
2. A trained man is an asset to any plant because he can relieve an injured employee of much suffering; in some cases he can actually save life itself.
3. Financial savings are generally realized through reduction in compensation and insurance payments.

Benefits to Plants

The Bureau of Mines has on record many letters showing the appreciation of the mineral industries for first-aid training. One of these letters received from the safety engineer of a large California petroleum company states that the benefits derived from training 1,451 men in first aid are most encouraging. It has resulted in a 50 per cent reduction in the number of infection cases, 98.5 per cent reduction in days of lost time from infections, and 95.2 per cent reduction in compensation and medical cost from infections. This results in a gross saving of approximately $73,740 a year by reducing infection cases through wholesale first-aid training. He further states that the secondary effect of such training has been quite apparent in reducing both the number and severity of accidents, with the result that large financial savings have been made.

Another letter from a superintendent of a large plant in Pennsylvania which operates a coal mine employing about 150 men states:

"It is our opinion that the effect of this (100 per cent first-aid training) training has had its effect in making our men more careful as we have just completed six successive months without a lost-time injury in our mine."

New Republic Company Plant Goes Into Operation

The middle of August saw the opening and operation of the New Republic Portland Cement Company plant at Longhorn, Texas.

Cement is manufactured by the wet process. Major machinery units consist of two 11 by 250-foot rotary kilns for burning, four 8 by 7 by 40-foot compeb mills for grinding, two 10 by 100-foot rotary coolers, large hammer mill for crushing and power units consisting of four 800 h. p. supersynchronous electric motors, two 300 h. p. units and eight units of 100 h. p. each and many units of smaller horsepower.

The new plant is located a short distance from San Antonio, between the main lines of the M. K. & T. and Missouri Pacific railroads. The small town known as Longhorn has been built at the mill to house resident foremen and workmen and includes in addition to their residences, offices, laboratories and a complete commissary.

When the company was chartered by the state last week the capitalization was given at $1,250,000 and 250,000 common shares with a minimum value of $5 each, making a total of $2,500,000.

Principals in the new company include J. H. Smith, president; W. M. Thornton, vice-president and general manager; F. A. Smith, Judge J. W. Young and A. F. Sayers.

J. A. Smith, its president, is actively identified with many other interests throughout the state.

The latter company is widely known for its development of Bowen's Island in San Antonio and the building there of the Smith-Young Tower, the Plaza Hotel, and other large commercial buildings.

W. M. Thornton, who is in active charge of the management of the company, has been associated with the San Antonio Portland Cement Company and the International Cement Corporation for the past 12 years.

Terrell Bartlett Engineering, Inc., of San Antonio, were the engineers on the project with Richard K. Meade of Baltimore as consulting engineer.

Cement Shipments "Satisfactory" Despite Small Decrease

Although portland cement shipments have been running nearly five per cent below last year for a period of seven months, it should be noted that a smaller portion is going into the large engineering projects, while a larger portion is going into building construction, according to "Digest of Trade Conditions," a leaflet prepared by the Central Trust Company of Illinois, at Chicago. Because of the tremendous consumption of portland cement in railroad work, highway building, and water control projects, the comparatively small amount of cement which is necessary to make a big increase in building construction is often overlooked, it continues. It is not to be expected that each year, as it comes, must break all records and, with that thought in mind, we should be ready to accept the building activity of 1929 as more than satisfactory, it concludes.

Completing Work on New National Company Plant

Construction of a $200,000 plant for the production of white portland cement is under way at Chubbuck, on the Phoenix extension of the Santa Fe Railroad between Cadiz, San Bernardino County, and Parker, Ariz. The project is being undertaken by the National Portland Cement Co. of El Paso.

With 75 men employed in the work, the first unit of the mill is being erected and was scheduled to be completed by September 15th. The first unit will have a capacity of 150 barrels a day.

The erection of the remainder of the plant will be started immediately after the first unit will have been completed. The finished plant will have a capacity of 750 barrels of cement a day.

Propose to Ship Italian Clinker for Finishing and Use in India

A new industrial development likely to affect the Indian cement industry, and affording opportunities to enterprising cement manufacturing concerns overseas, has been brought to light by the Bombay Director of Industries. It refers to an inquiry received by that office regarding the availability of gypsum for cement-making. The project is to import clinker from Italy and manufacture cement in Bombay in its last stages only, thus escaping the heavy tariff which prevents overseas cement from competing with the Indian product.

Spanish Cement Plant

Located Adjacent to

Rich Raw Materials

A Description of the Newest Plant of the Compania General de Asfaltos y Portland "Asland," Villaluenga, Spain

Part III

(Concluded from September Issue)

Handling of the Coal

The calcination within the kiln is effected by means of pulverized coal, the coal used in the process coming from the mines of Puertollano, Province of Ciudad Real, and giving the following analysis:

	Per cent
Volatile carbons	26.00
Fixed carbon	55.60
Ash	14.30

The coal reaches the factory in railroad cars and is unloaded into an iron hopper 7 by 10 meters (22 by 32 ft.) in size, which in turn discharges upon a 14-in. inclined belt conveyor 55 meters (175 ft.) long. This runs on a metal work bridge covered with concrete, and rests, at its upper end, upon the building containing the dryers and the mills. The coal drops into a cylindrical bin 4.40 meters (14 ft.) in diameter and 5 meters (16 ft.) high, holding 70 tons. At the bottom of the bin is the machine for feeding the dryer. When the bin and hopper are full, the coal is unloaded into another bin of reinforced concrete, 40 meters (128 ft.) long, 12 meters (38 ft.) wide and 2.50 meters (8 ft.) deep, which holds 1000 tons and is placed alongside of the track.

Coal Dryer Operation

The coal dryer is of the Ruggles Coles make, Class A, No. 8, 60 in. in diameter and is equipped with a fan for producing forced draft and a dust-chamber 7 ft. in diameter, to allow the air to expand and the dust in suspension to be recovered. It is driven by a 12-h.p. motor, with a 30 to 750 speed reducer, and turns out 9000 lbs. of dried coal per hour. At the outlet of the dryer the coal discharges into an 8- by 16-in. bucket elevator 14 meters (45 ft.) high, which carries it to the feed bin of the coal mills. This bin is of iron and holds 80 tons; its bottom is in the form of a hopper and connects with the feeding device of one of the coal mills. From one side of the bin a 10-in. pipe carries the coal to the feeding device of another coal mill.

Coal Mills

The coal mills are of the 6-pendulum Raymond type, equipped with No. 11 suction fans, and handle 4500 kilograms per hour each. They are belted to 75-h.p. motors, two other motors of 50 h.p. each being required to drive the fans. The coal is collected in two chambers placed above the feed hopper of the kiln into which it discharges.

The coal used for the dryer likewise comes from the feed hopper of the kiln, passing through a 10-in. pipe which leads to a sheet-iron bin, connected by a pipe with the pressure tank of an Ingersoll-Rand T-20 vertical stationary 5- by 5-in. compressor which is run by a General Electric 15-h.p. motor. The compressor forces air at four atmospheres into the sheet-iron bin and drives the coal out of a nozzle fitting into a 1¾-in. pipe 195 meters (624 ft.) long into a chamber placed above the iron feed hopper of the dryers, where it is discharged.

Electric Equipment

The entire factory is electrified, the 1600-kw. hr. generator distributing the power produced by it in two groups. Part of the 2200-volt current goes directly to the 500-h.p. Allis-Chalmers motors already mentioned as driving the mills and as working at that voltage; the rest goes to five transformers of which one is located in the main powerhouse while the others are distributed elsewhere, as shown below:

Condensed water cooler

Powerhouse—One Willen Smith 3-phase, 50-cycle, 500 k.v.a. oil-cooled stepdown transformer, 2200 to 220 volts.

Dryers for Raw Material—One 3-phase, 120 k.v.a. oil-cooled stepdown transformer, 2200 to 220 volts.

Crusher—One 3-phase, 150 k.v.a. oil-cooled stepdown transformer, 2200 to 220 volts.

Factory Lighting System—One 3-phase, 70 k.v.a. stepdown transformer, 2200 to 220 to 127 volts.

Water Supply Pump—One 3-phase, 85 k.v.a. stepdown transformer, 2200 to 220 to 127 volts.

The high and low tension switchboards are entirely separate, thus completely isolating the high and low tension systems from each other. The feed connections between the turbo-generator and its switchboard and between the latter and outlet of the lines are by underground cable; the distribution of the low tension system and the grouping of its motors has been planned with an eye to permitting the control of the most distant line from the general switchboard. The safety devices for the outside low-tension lines are of the Westinghouse MP type; and the transformer stations have all of their safety devices on the high-tension ends and switchboards with the necessary automatic cut-outs and meters for low-tension distribution.

The low-tension switch board

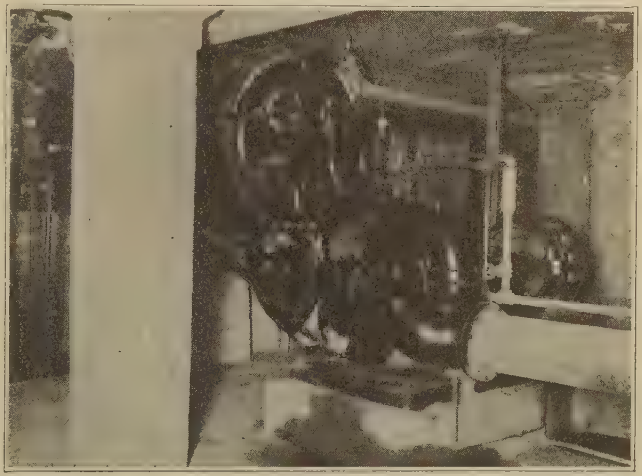
The high-tension switchboard consists of five panels with all of necessary metering and safety devices and the low-tension board consists of 11 panels, properly equipped with meters and control and safety appliances.

There are in all, 56 motors, having the horsepower and distribution shown in the following table:

1	7.50	h.p.	motor	in the machine shop
1	100	“	“	in Crusher No. 1
1	15	“	“	Screen and Conveyor No. 1
1	55	“	“	Cylinders and Conveyors Nos. 2 and 3
1	15	“	“	Dryer No. 1
1	15	“	“	Dryer No. 2
1	12	“	“	Conveyor No. 5
1	12	“	“	Conveyor No. 6
1	3	“	“	Schaffer Poidometer
1	12	“	“	Conveyor No. 7
1	500	“	“	Compeb Mill for raw material
1	500	“	“	Compeb Mill for finished material
1	12	“	“	Screw conveyor No. 1, mill for raw material
1	12	“	“	Screw conveyor No. 2, tunnel for raw material
1	15	“	“	Elevator No. 1 for raw material
1	15	“	“	Elevator No. 2 for raw material
1	12	“	“	Screw conveyor No. 3
1	60	“	“	Kiln and feeder
1	12	“	“	Return (screw) conveyor
1	20	“	“	Cooler
1	150	“	“	Boiler fan
1	60	“	“	Condenser circulating pump
1	60	“	“	Exciter for the mill motors
1	3	“	“	Condenser ejector pump
1	12	“	“	Clinker elevator
1	12	“	“	Clinker conveyors Nos. 8 and 9
1	12	“	“	Clinker conveyor No. 10 (tunnel)
1	12	“	“	Clinker conveyor No. 11
1	12	“	“	Clinker conveyor No. 12
1	12	“	“	Screw conveyor to bins
1	15	“	“	Screw conveyor to bagging-room
1	12	“	“	Elevator and screen
1	15	“	“	Bates bagging machine
1	12	“	“	Conveyor No. 14
1	12	“	“	Ruggles Coles dryer
2	75	“	“	Raymond mills Nos. 2 and 3
2	50	“	“	Fans for same
1	20	“	“	Fan for kiln
1	35	“	“	Crusher No. 2
1	50	“	“	Williams Mill
1	48	“	“	Quarry compressor
1	10	“	“	Well No. 1, Station
1	12	“	“	Screw conveyor for ashes from the dryer
1	12	“	“	Conveyor No. 15
1	15	“	“	Conveyor No. 4
1	15	“	“	Compressor for coal
1	15	“	“	Crane
2	1.50	“	“	Feeding coal to dryers
2	0.50	“	“	Screw conveyor for dryers
1	3	“	“	Laboratory
1	12	“	“	Well No. 2, Station

Auxiliary Power Installations

In case of emergency when the factory and the kiln are in operation, there is available a 170 h.p. Diesel motor, with a 3-phase 220-volt a.c. generator. There is also installed a 600 h.p. Babcock and Wilcox tubular boiler with a heating surface of 400 square meters (4304 sq. ft.) and a Babcock and Wilcox reheater. This boiler is likewise connected with the turbo-generator of the main power house, which may be run by either one of the two boilers. The Babcock and Wilcox boiler is heated with pulverized coal, carried to the feed bin by means of compressed air through a 1¾ in. pipe having a settling chamber at its end. The gases produced by the combustion of the coal, as well as those from the kiln when the Edge Moor boiler is being used, are led to a natural draft chimney of reinforced concrete, 52 meters (166 ft.) high and 3 meters (10 ft.) in diameter at the point at which the gases escape. The Babcock boiler is installed in the building adjacent

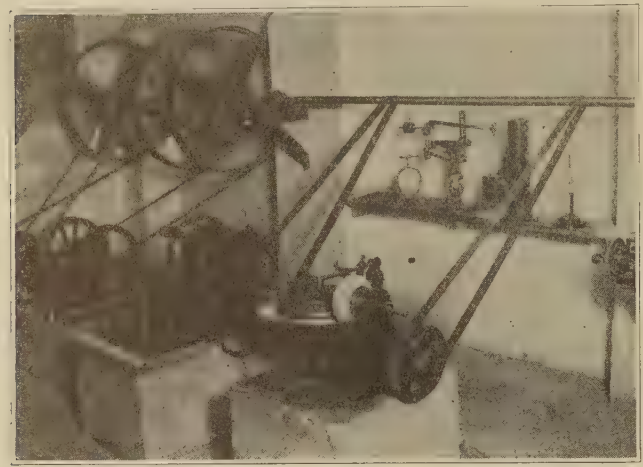


The condenser and circulating pump

to the factory, built of reinforced concrete, 8.50 meters (27 ft.) long, 5.50 meters (18 ft.) wide and 9 meters (29 ft.) high.

Shops, Laboratory and Storeroom

The repair shop is situated in a building of 3-wings, 35 meters (112 ft.) long and 24 meters (77 ft.) wide. The side wings are used for storage and for the carpenter shop and are 5 meters (16 ft.) high. The central portion, where the machine shops are, is arched and 9 meters (29 ft.) high. The shops contain the following equipment:



A corner in the physical testing laboratory

1	Lathe, 20 x 15 in. x 6 ft.
1	Radial drilling machine, 40-in.
1	Drilling machine for holes up to 22 millimeters (8½ in.)
1	420 millimeter (16 in.) planer
1	Rectifier, with an electric ⅛ h.p. motor
1	Oxy-acetylene welding apparatus
2	Emery wheels
3	Stationary forges with ordinary bellows. Portable forges and miscellaneous tools.

The laboratory consists of two departments, one of them for complete analyses and assays, and the other for rapid analyses of the materials in the various phases of manufacture. There is also another department for assays and tests of the physical properties of the cement, and for the preparation of samples, equipped with machines for crushing and grinding these down to a fine powder; mixing machines, Bohmler hammers, a mechanical screen, machines for testing the strength of the concrete under tension and compression and for determining change in volume. By these means the desired end is achieved, namely, the obtention of a strong, high grade cement, and a steady output, which may reach 80,000 tons annually.

The strength of the cement is shown by the following tables:

Strength Tests, Average for One Year

Mortar, 1:3

	Tension	Compression
1st day	17.6 kg. per sq. cm.	143 kg. per sq. cm.
3rd day	26.3 kg. per sq. cm.	276 kg. per sq. cm.
5th day	28.1 kg. per sq. cm.	336 kg. per sq. cm.
7th day	30.0 kg. per sq. cm.	373 kg. per sq. cm.
28th day	34.7 kg. per sq. cm.	484 kg. per sq. cm.
90th day	37.8 kg. per sq. cm.	571 kg. per sq. cm.
6 months	40.5 kg. per sq. cm.	628 kg. per sq. cm.
1 year	45.5 kg. per sq. cm.	699 kg. per sq. cm.

Neat Cement

	Tension	Compression
7th day	52.0 kg. per sq. cm.	684 kg. per sq. cm.
28th day	55.0 kg. per sq. cm.	869 kg. per sq. cm.
90th day	52.0 kg. per sq. cm.	1087 kg. per sq. cm.
6 months	50.3 kg. per sq. cm.	1077 kg. per sq. cm.
1 year	52.0 kg. per sq. cm.	1080 kg. per sq. cm.

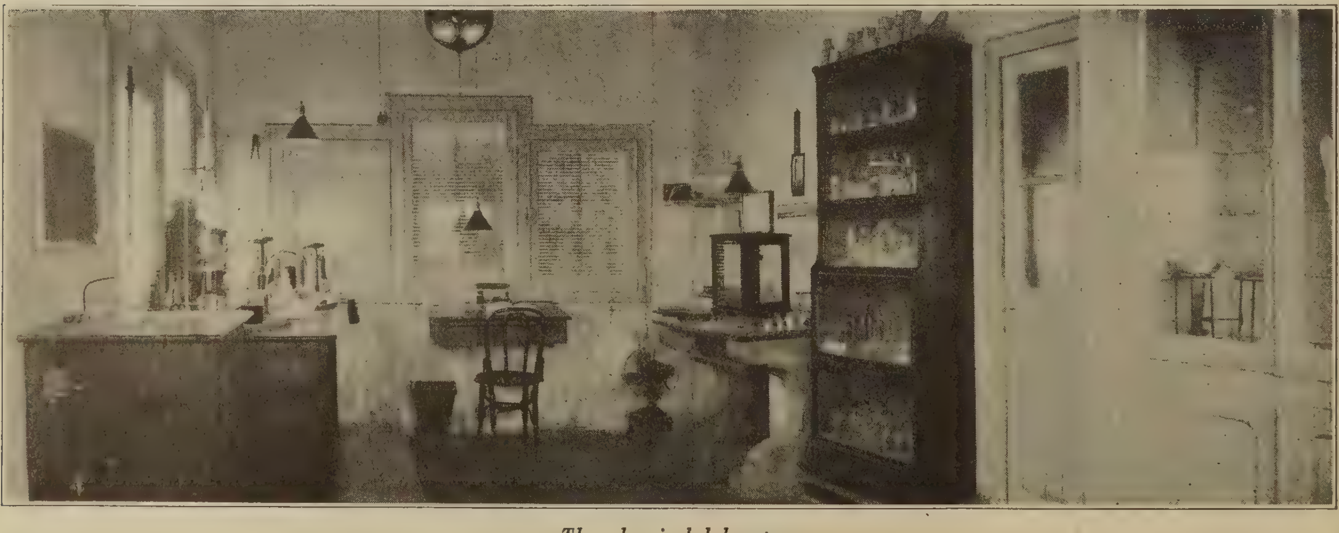
Average Composition

SiO_2	21.16
Al_2O_3	6.00
Fe_2O_3	2.00
CaO	65.33
MgO	2.01
SO_3	1.62
Insoluble	1.96

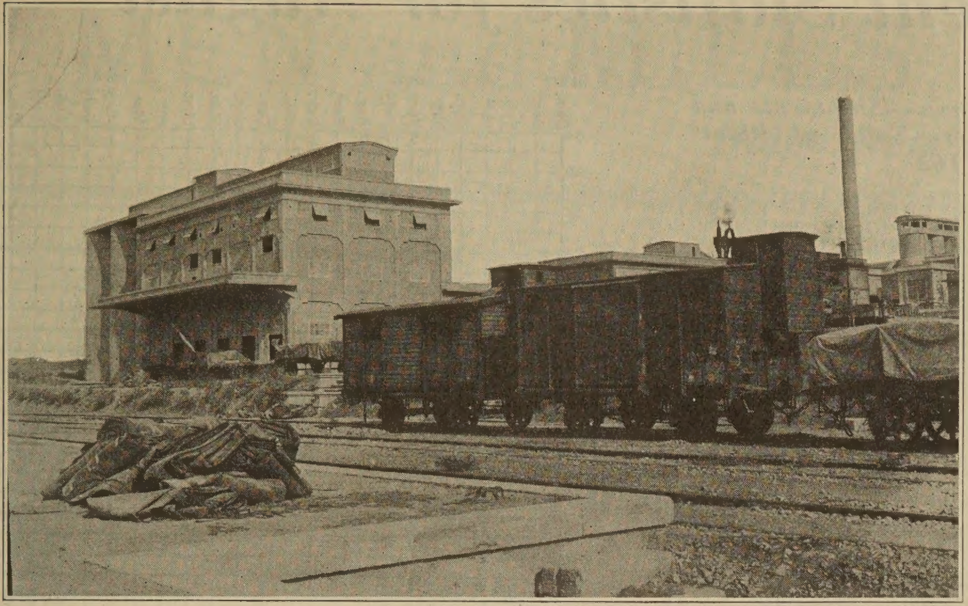
Railroad Facilities

For the transportation of coal and raw material and shipping the cement, the company has built a 12 kilometer (7 mile) standard-gauge (1.672 meter or approx. 5 ft.) line, which connects the lines of the two most important companies of the country, namely, the Madrid, Zeragoza and Alicante and the Madrid, Caceres, Portugal and Western Spain Railroads. The cement can therefore be sent to any part of the Spanish territory, through which it may go in four different directions.

The line of the Asland Company is called the "Secondary Villaluenga and Villaseca Railroad." The rails



The chemical laboratory



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The pack house and side tracks for railway shipments

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weigh 45 kilograms (99 lbs.) per meter (3.2 ft.) and are 12 meters (38 ft.) long, laid on oak ties, 18 to the rail. It has four reinforced concrete bridges and 2 stations along its route. The first of these, Villaluenga Asland, consists of 3 buildings: The passenger station and living quarters of the station agents, 8 by 20 meters (26 by 64 ft.); the engine house and shops, 20 by 39 meters (64 by 125 ft.) and the freight house, 10 by 20 meters (32 by 64 ft.). All of these buildings are of reinforced concrete, like those of the factory. The unloading station at Villasceca consists of a concrete building of 2 stories surrounded by a retaining wall which forms the platform. The company has all of the engines and rolling stock necessary to supply the needs of the factory.

Future Plans

Finally, the great demand in the Spanish market for the cement produced by this factory has made it necessary to plan for an enlargement of the same in order that its production may be doubled. A second kiln, similar to that at present in use, will be installed with all of the machinery necessary for its operation and with all advanced appliances which will make the plant one of the most important in Europe and the foremost in Spain. Work on these improvements will begin within this year.

Historical Dates

On November 2nd, 1924, the first steps were taken to organize the work. On January 9th, 1925, the excavations for the foundations of the factory were begun. On July 14th, 1925, the first machinery shipped from the United States was received. On November 25th, 1925, the Diesel motor was started. On February 11th, 1926, the turbogenerator was started by the manager. On February 25th, 1926 the first 100 tons of cement were produced, which means that from the first stroke of the pick to the production of the first cement, only 13 months and 16 days elapsed.

Executive Personnel of the Factory

The executive personnel of the plant is as follows: A. Duverger, head of the electrical department; E. Ferrer, manager; Nin Devesa, consulting engineer; M. Cisneros, chemist; J. Velar, assistant managing engineer.

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The railroad station adjacent to the plant

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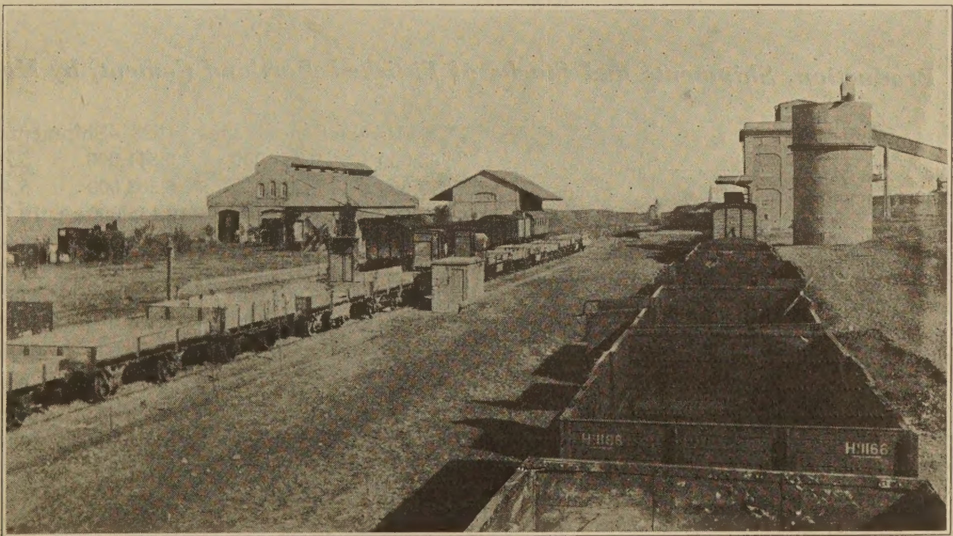


Cement Statistics for August

August Production Lower—Shipments and Stocks Slightly Higher—Total of Plants Now 163

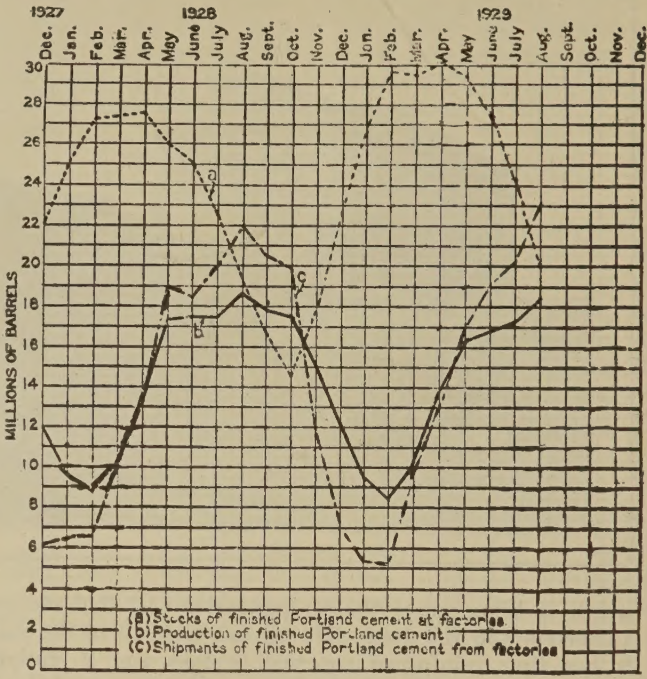
NOTE: IN ORDER THAT THE READER MAY KNOW THE TREND AT A GLANCE, THE HIGHER FIGURE, WHETHER FOR EITHER YEAR, UNDER ANY CLASSIFICATION, APPEARS IN SLIGHTLY HEAVIER TYPE.

Relation of Production to Capacity

(Figures represent per cent)

	—August—		July	June	May
	1928	1929	1929	1929	1929
The month	**93.1**	86.1	80.4	80.9	76.4
The 12 months ended	**73.5**	68.2	68.9	69.0	70.2

	1928	1929	Increase or Decrease, Per Cent
Production, August	**18,759,000**	18,594,000	— .9
Shipments, August	21,970,000	**23,019,000**	4.8
Stocks at end of August	19,374,000	**20,101,000**	3.8
Total production for year to date	**113,294,000**	110,951,000	—1.2
Total shipments for year to date	**115,824,000**	113,562,000	—1.9



Production, Shipments and Stocks of Finished Portland Cement, by Districts, in August, 1928 and 1929, and Stocks in July, 1929

District	Production—August		Shipments—August		Stocks at end of month		Stocks at end of July,
	1928	1929	1928	1929	1928	1929	1929*
Eastern Pa., N. J., and Md.	**4,024,000**	3,941,000	4,403,000	**4,584,000**	**5,524,000**	4,747,000	5,389,000
New York and Maine	1,320,000	**1,449,000**	1,519,000	**1,747,000**	1,423,000	**1,467,000**	1,765,000
Ohio, Western Pa., and W. Va.	2,047,000	**2,190,000**	**2,687,000**	2,431,000	2,447,000	**3,194,000**	3,435,000
Michigan	**1,614,000**	1,581,000	2,070,000	**2,290,000**	**1,297,000**	1,270,000	1,979,000
Wisconsin, Illinois, Indiana, and Ky.	**2,548,000**	2,425,000	3,076,000	**3,275,000**	1,967,000	**2,318,000**	3,168,000
Va., Tenn., Ala., Ga., Fla., and La.	**1,508,000**	1,450,000	**1,699,000**	1,644,000	**1,676,000**	1,624,000	1,818,000
Eastern Mo., Iowa, Minn., and S. Dak.	**1,901,000**	1,578,000	2,372,000	**2,589,000**	2,073,000	**2,081,000**	3,092,000
Western Mo., Nebr., Kans., and Okla.	1,181,000	**1,430,000**	1,312,000	**1,773,000**	**1,222,000**	926,000	1,269,000
Texas	519,000	**707,000**	623,000	**786,000**	257,000	**466,000**	546,000
Colo., Mont., Utah, Wyo. and Idaho	290,000	**357,000**	364,000	**368,000**	382,000	**518,000**	529,000
California	**1,288,000**	1,128,000	**1,294,000**	1,123,000	746,000	**997,000**	991,000
Oregon and Washington	**519,000**	358,000	**551,000**	409,000	360,000	**493,000**	544,000
	18,759,000	18,594,000	21,970,000	**23,019,000**	19,374,000	**20,101,000**	24,525,000

Production, Shipments and Stocks of Finished Portland Cement, by Months, in 1928 and 1929

Month	1928—Production—1929		1928—Shipments—1929		Stocks at end of month	
					1928	1929
January	9,768,000	**9,881,000**	**6,541,000**	5,707,000	25,116,000	**26,797,000**
February	**8,797,000**	8,522,000	**6,563,000**	5,448,000	27,349,000	**29,870,000**
March	**10,223,000**	9,969,000	**10,135,000**	10,113,000	27,445,000	**29,724,000**
April	13,468,000	**13,750,000**	13,307,000	**13,325,000**	27,627,000	**30,151,000**
May	**17,308,000**	16,151,000	**18,986,000**	16,706,000	25,984,000	***29,624,000**
June	**17,497,000**	*16,803,000	18,421,000	**18,949,000**	25,029,000	***27,457,000**
July	**17,474,000**	*17,281,000	19,901,000	***20,295,000**	22,580,000	***24,525,000**
August	**18,759,000**	18,594,000	21,970,000	**23,019,000**	19,374,000	**20,101,000**
September	17,884,000	....	20,460,000	....	16,799,000	....
October	17,533,000	....	19,836,000	....	14,579,000	....
November	15,068,000	....	11,951,000	....	17,769,000	....
December	12,189,000	....	7,384,000	....	22,650,000	....
	175,968,000	....	175,455,000	....	....	....

*Revised.

MEN and MILLS

Notes from the Field

Northwestern States Appoints New Aid to President

B. A. MacDonald, for 11 years sales manager for the Northwestern States Portland Cement Company, has been selected as assistant to the president, taking the place vacated by the death of R. E. Boyle.

J. B. Cabanis, for a number of years western sales manager for the Atlas Portland Cement Company and lately sales manager for a group of British cement firms, has taken the place of Mr. MacDonald as sales manager.

Manheim Plant Honored Upon Completing Two Years Without Accident

The Manheim, West Virginia, plant of the Alpha Portland Cement Company completed on August 20th two consecutive years of operation with a perfect safety record.

Its outstanding record has brought the plant local glory and national recognition. The record has been equalled but once previously by any mill in the United States or Canada and in recognition of the fact the Portland Cement Association has awarded a certificate of merit to the plant.

The association trophy was presented during July, when the governor of the state was the chief speaker.

A photograph of the members of the plant safety committee appeared in the September issue in these columns.

San Antonio Company Provides Barbecue Dinner

The San Antonio Cement Company was host to five hundred persons at a barbecue dinner August 8th, at Cementville, Texas.

Charles Baldus, treasurer, was host in the absence of Charles Baumberger, president.

Highway Engineer Joins International

Terminating six years of service with the Pennsylvania Highway Department, John L. Herber, beginning on October 1st, is associated with the International Cement Corporation at Philadelphia, Pa., in a managerial capacity.

Mr. Herber held the position of Pittsburgh division engineer of the department.

Old Time Cowboys and Cattle Help Sell Longhorn Cement

As in its colorful advertising, described in previous pages of CONCRETE in this issue, early life in Texas figures prominently in the local publicity of the Republic Portland Cement Company, whose plant at Longhorn, Texas, has just gone into operation.

The following, from the San Antonio press, is an example.

"George W. Saunders, president of the Old Trail Drivers' Association, is elated over the announcement of the Republic Portland Cement Company adopting the name, 'Longhorn,' for its new Texas product. Saunders began his research work gathering data on the trail and sketches of old trail drivers and pioneer stockmen for his books in 1874, after going to the records of the cattle counties all over the state, getting the tallies at the crossing on Red River and at all northern markets, Saunders found nearly 10,000,000 cattle and 1,000,000 horses had been driven to the northern markets during the trail driving period. He figured that the ranchmen in Texas received $10 per head on an average for this stock. He showed the figures to many old trail drivers. They all agreed that the figures were conservative. Later he learned from Col. Charles Goodnight that over 250,000 cattle were driven over the Goodnight and Loving trail, adding many thousands that were driven to California during the late '60s and early '70s. With more than 10,000,000 cattle and 1,000,000 horses driven to the northern markets during the trail driving period, the proceeds were at least $250,000,000, which was used to start the development of Texas.

"There were 40,000 cowboys used in this great work, many of them resting in unmarked graves along the different trails. Survivors are identified in every line of work and business.

"Saunders was on the trail from 1871 to 1886. He was born on a cattle ranch in Gonzales County, Texas, in 1854."

Yosemite Company Offices at San Francisco Removed to New Building

The sales offices of the Yosemite Portland Cement Corporation on September 1st removed from the Standard Oil Building at San Francisco to the Board of Trade Building in that city.

Peyton New Marquette Sales Manager

Charles Peyton has been appointed general sales manager of the Marquette Cement Manufacturing Company, at Chicago. He succeeds Paul R. Price, resigned.

Lehigh Safety Committee

Members of the Safety Committee of the Bath, Pennsylvania, plant of the Lehigh Portland Cement Co. This plant operated through 1928 with no accident

With the Manufacturers

INDUSTRIAL LITERATURE

Protective Metallic Coating

Cristite is a metal designed to protect all parts of equipment subject to extreme conditions. An outline of its properties is contained in a four-page folder published by the *Commercial Alloys Corporation*, San Francisco, Calif., who manufacture the product.

Cristite is described as being a true homogenous alloy, whose homogenity is obtained through the use of newly developed and patented electric furnace processes. It is also said that the hardness and other physical qualities of Cristite are not affected by heat treating or tempering up to a temperature of 1600 deg. F.

G-E Catalog Additions

The General Electric Company, Schenectady, New York, has recently issued additions to its looseleaf catalogs on the following equipment: arc welder, direct-current motors, arc-welding accessories, fan-cooled squirrel-cage motors, gas-engine driven arc welder, and automatic starting compensators.

Engineering Data Book

The Chain Belt Company, Milwaukee, Wisconsin, and the *Stearns Conveyor Co.*, Cleveland, Ohio, a branch of the Chain Belt Co., specializing in belt conveyors, are distributing the new Rex 330 Catalog and Engineering Data Book—an 800 page publication describing the company's complete line of chains, power transmission equipment, water screening equipment and elevators and conveyors for the mechanical handling of material. In addition to detailed descriptions of all equipment manufactured by the company, the book contains a great deal of specialized engineering information that will be of interest to executives and engineer operating officials, including discussions of chain drives, the selection, application, operation and care of chain, the selection, operation and maintenance of elevators and conveyors for the mechanical handling of material, and many other subjects of a similar nature.

Special sections of the catalog are devoted to detailed discussions of conveying systems. Specific installations are shown, with carefully prepared line drawings of entire plants and conveyor installations. In many cases definite figures are given showing the savings that have been attained, or the increase in production that has been achieved by the installation of conveying systems.

The book is profusely illustrated with several hundred photographs of specific installations, in addition to the large number of line drawings. The last 30 pages of the catalog are given over to general engineering data of a nature that will assist the executive or engineer operating official in the selection, construction, operation and maintenance of systems for the mechanical handling of material.

C-E Water Level Indicator

The Combustion Engineering Corporation has issued a folder illustrating and describing the C-E Water Level Indicator.

This is a device for indicating the water level in the boiler at the eye level of the operator. It is possible to locate the indicator to meet any local condition, and it is easy to install, it is said.

The C-E Water Level Indicator operates in the cold water circuit, making it valuable at the higher pressures where the water temperatures cause the gauge glass to become foggy in a very short time.

Vertical Motor Publication

The *Wagner Electric Corporation* of St. Louis, Missouri, has issued a new bulletin No. 159 on large vertical motors, covering all types, in ratings of 1½ to 30 h.p. As illustrated by diagrams in this bulletin, a feature of these motors is that they all have the same flange or lug dimensions, making it possible for manufacturers and users of small motor-driven machinery to interchange motors of different types and ratings on the same mounting dimension.

This feature makes it unnecessary to change the mounting base in order to interchange vertical motors of different types and ratings, effecting a saving in time and expense for manufacturers and users of machinery operated by vertical or flange-mounted motors, it is said.

Another feature is the Wagner "labyrinth seal" to prevent the leakage of lubricant into motor windings, and effecting a dust-proof, leak-proof bearing housing. The vertical motors can also be mounted horizontally or obliquely. The line includes repulsion-induction and squirrel cage motors, in 1200 to 3600 r.p.m. and 25 to 60 cycle.

"Calyx Drills"

A new bulletin entitled "'Calyx' Drills" gives complete details of the various sizes and types of drills and general data on the subject of core drilling.

The drills are used for determining the character, order, thickness and extent of materials below the surface of the earth by means of cylindrical cores.

The catalog is comprised of 44 pages and is published by the *Ingersoll-Rand Company*, New York City.

Amsco Publication

With the July issue, the *American Manganese Steel* publication "*New Applications*" enters its ninth month and publication. Again numerous instances are given in which the Amsco products proved their durability.

A somewhat lengthy description is also given of the successful meeting of an overburden problem in hydraulic dredging operation.

New Crane Book

Link-Belt Company, Chicago, Illinois, has issued a 48-page book, profusely illustrated, describing its complete line of gasoline, diesel, electric and steam operated cranes, shovels and draglines.

This book gives detailed specifications of the machines with capacities from ¾ yard to 2 yard. Outstanding features and construction details of machines are described.

Nofuz Panelboard Leaflet

A new panelboard is described in a recent circular D. M. F. 5150, released by the *Westinghouse Electric and Manufacturing Company*. This recent development has been designated the Nofuz Type NAB panelboard; it operates with 15 ampere deion principle circuit breakers in place of fuses and toggle switches.

In a concise manner the booklet explains the uses and construction of the panelboard and its application. Wiring diagrams and photographs illustrate the folder.

NOTES FROM THE FIELD

New York Office of Fuller-Lehigh Changes Address

The New York office of the *Fuller-Lehigh Company* has removed from 50 Church Street to 85 Liberty Street.